MITSUBISHI ELECTRIC

Mitsubishi Programmable Controller

MELSEC iQ-R series

MELSEC iQ-R Module Configuration Manual

SAFETY PRECAUTIONS

(Read these precautions before using this product.)

Before using MELSEC iQ-R series programmable controllers, please read the manuals for the product and the relevant manuals introduced in those manuals carefully, and pay full attention to safety to handle the product correctly.

In this manual, the safety precautions are classified into two levels: "⚠WARNING" and "⚠CAUTION".

⚠ **WARNING**	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠ **CAUTION**	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Under some circumstances, failure to observe the precautions given under "⚠CAUTION" may lead to serious consequences.

Observe the precautions of both levels because they are important for personal and system safety.

Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

[Design Precautions]

⚠WARNING

- Configure safety circuits external to the programmable controller to ensure that the entire system operates safely even when a fault occurs in the external power supply or the programmable controller. Failure to do so may result in an accident due to an incorrect output or malfunction.
  (1) Emergency stop circuits, protection circuits, and protective interlock circuits for conflicting operations (such as forward/reverse rotations or upper/lower limit positioning) must be configured external to the programmable controller.
  (2) When the programmable controller detects an abnormal condition, it stops the operation and all outputs are:
    - Turned off if the overcurrent or overvoltage protection of the power supply module is activated.
    - Held or turned off according to the parameter setting if the self-diagnostic function of the CPU module detects an error such as a watchdog timer error.
  (3) All outputs may be turned on if an error occurs in a part, such as an I/O control part, where the CPU module cannot detect any error. To ensure safety operation in such a case, provide a safety mechanism or a fail-safe circuit external to the programmable controller. For a fail-safe circuit example, refer to Page 126 General Safety Requirements in this manual.
  (4) Outputs may remain on or off due to a failure of a component such as a relay and transistor in an output circuit. Configure an external circuit for monitoring output signals that could cause a serious accident.
- In an output circuit, when a load current exceeding the rated current or an overcurrent caused by a load short-circuit flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse.
- Configure a circuit so that the programmable controller is turned on first and then the external power supply. If the external power supply is turned on first, an accident may occur due to an incorrect output or malfunction.
- For the operating status of each station after a communication failure, refer to manuals relevant to the network. Incorrect output or malfunction due to a communication failure may result in an accident.
- When connecting an external device with a CPU module or intelligent function module to modify data of a running programmable controller, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents.
- Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.
- Do not write any data to the "system area" and "write-protect area" of the buffer memory in the module. Also, do not use any "use prohibited" signals as an output signal from the CPU module to each module. Doing so may cause malfunction of the programmable controller system. For the "system area", "write-protect area", and the "use prohibited" signals, refer to the user's manual for the module used.

[Design Precautions]

⚠WARNING

- If a communication cable is disconnected, the network may be unstable, resulting in a communication failure of multiple stations. Configure an interlock circuit in the program to ensure that the entire system will always operate safely even if communications fail. Incorrect output or malfunction due to a communication failure may result in an accident.
- To maintain the safety of the programmable controller system against unauthorized access from external devices via the network, take appropriate measures. To maintain the safety against unauthorized access via the Internet, take measures such as installing a firewall.

[Precautions for using digital-analog converter modules]

- Analog outputs may remain on due to a failure of the module. Configure an external interlock circuit for output signals that could cause a serious accident.

[Precautions for using high-speed counter modules]

- Outputs may remain on or off due to a failure of a transistor for external output. Configure an external circuit for monitoring output signals that could cause a serious accident.

[Precautions for using positioning modules and Simple Motion modules]

- Configure safety circuits external to the programmable controller to ensure that the entire system operates safely even when a fault occurs in the external power supply or the programmable controller. Failure to do so may result in an accident due to an incorrect output or malfunction.
  (1) Machine OPR (Original Point Return) is controlled by two kinds of data: an OPR direction and an OPR speed. Deceleration starts when the near-point dog signal turns on. If an incorrect OPR direction is set, motion control may continue without deceleration. To prevent machine damage caused by this, configure an interlock circuit external to the programmable controller.
  (2) When the positioning module detects an error, the motion slows down and stops or the motion suddenly stops, depending on the stop group setting in parameter. Set the parameters to meet the specifications of the positioning control system used. In addition, set the OPR parameters and positioning data within the specified setting range.
  (3) Outputs may remain on or off, or become undefined due to a failure of a component such as an insulation element and transistor in an output circuit, where the positioning module cannot detect any error. In a system where the incorrect outputs could cause a serious accident, configure an external circuit for monitoring output signals.
- An absolute position restoration by the positioning module may turn off the servo-on signal (servo off) for approximately 60ms + scan time, and the motor may run unexpectedly. If this causes a problem, provide an electromagnetic brake to lock the motor during absolute position restoration.

[Precautions for using Motion CPU modules and Simple Motion modules]

- If safety standards (ex., robot safety rules, etc.,) apply to the system using the module, servo amplifier and servo motor, make sure that the safety standards are satisfied.
- Construct a safety circuit externally of the module or servo amplifier if the abnormal operation of the module or servo amplifier differs from the safety directive operation in the system.

[Precautions for using CC-Link IE Controller Network (when optical fiber cables are used)]

- The optical transmitter and receiver of the CC-Link IE Controller Network module use laser diodes (class 1 in accordance with IEC 60825-1). Do not look directly at a laser beam. Doing so may harm your eyes.

[Design Precautions]

⚠WARNING

[Precautions for using CC-Link system master/local modules]

- To set a refresh device in the module parameters, select the device Y for the remote output (RY) refresh device. If a device other than Y, such as M and L, is selected, the CPU module holds the device status even after its status is changed to STOP. For how to stop data link, refer to the MELSEC iQ-R CC-Link System Master/Local Module User's Manual (Application).

[Precautions for using C Controller modules]

- In the settings of refresh parameters, link output (LY) refresh devices and remote output (RY) refresh devices do not allow the specification of "Y". Thus, the CPU module holds the device status even after its status is changed to STOP.

[Design Precautions]

⚠CAUTION

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 100mm or more between them. Failure to do so may result in malfunction due to noise.
- During control of an inductive load such as a lamp, heater, or solenoid valve, a large current (approximately ten times greater than normal) may flow when the output is turned from off to on. Therefore, use a module that has a sufficient current rating.
- After the CPU module is powered on or is reset, the time taken to enter the RUN status varies depending on the system configuration, parameter settings, and/or program size. Design circuits so that the entire system will always operate safely, regardless of the time.
- Do not power off the programmable controller or reset the CPU module while the settings are being written. Doing so will make the data in the flash ROM undefined. The values need to be set in the buffer memory and written to the flash ROM again. Doing so also may cause malfunction or failure of the module.
- When changing the operating status of the CPU module from external devices (such as the remote RUN/STOP functions), select "Do Not OPEN in Program" for "Open Method Setting" in the module parameters. If "OPEN in Program" is selected, an execution of the remote STOP function causes the communication line to close. Consequently, the CPU module cannot reopen the line, and external devices cannot execute the remote RUN function.

[Precautions for using digital-analog converter modules]

- Power on or off the external power supply while the programmable controller is on. Failure to do so may result in incorrect output or malfunction.
- At on/off of the power or external power supply, or at the output range switching, a voltage may occur or a current may flow between output terminals for a moment. In this case, start the control after analog outputs become stable.

[Precautions for using high-speed counter modules]

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 150mm or more between them. Failure to do so may result in malfunction due to noise.

[Installation Precautions]

⚠WARNING

- Shut off the external power supply (all phases) used in the system before mounting or removing the module. Failure to do so may result in electric shock or cause the module to fail or malfunction.

[Precautions for using C Controller modules]

- Do not mount a C Controller module on the right end of the base unit. When no module is mounted at the right side of a C Controller module, be sure to attach a blank cover module (RG60) to prevent entrance of foreign material such as dust.

[Installation Precautions]

⚠CAUTION

- Use the programmable controller in an environment that meets Page 48 General Specifications in this manual. Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.
- To mount a module, place the concave part(s) located at the bottom onto the guide(s) of the base unit, and push in the module until the hook(s) located at the top snaps into place. Incorrect interconnection may cause malfunction, failure, or drop of the module.
- When using the programmable controller in an environment of frequent vibrations, fix the module with a screw.
- Tighten the screws within the specified torque range. Undertightening can cause drop of the screw, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- When using an extension cable, connect it to the extension cable connector of the base unit securely. Check the connection for looseness. Poor contact may cause malfunction.
- When using an SD memory card, fully insert it into the SD memory card slot. Check that it is inserted completely. Poor contact may cause malfunction.
- Securely insert an extended SRAM cassette into the cassette connector of the CPU module. After insertion, close the cassette cover and check that the cassette is inserted completely. Poor contact may cause malfunction.
- Do not directly touch any conductive parts and electronic components of the module, SD memory card, extended SRAM cassette, or connector. Doing so can cause malfunction or failure of the module.

[Wiring Precautions]

⚠WARNING

- Shut off the external power supply (all phases) used in the system before installation and wiring. Failure to do so may result in electric shock or cause the module to fail or malfunction.
- After installation and wiring, attach the included terminal cover to the module before turning it on for operation. Failure to do so may result in electric shock.

[Wiring Precautions]

⚠CAUTION

- Individually ground the FG and LG terminals of the programmable controller with a ground resistance of 100 ohms or less. Failure to do so may result in electric shock or malfunction.
- Use applicable solderless terminals and tighten them within the specified torque range. If any spade solderless terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure.
- Check the rated voltage and signal layout before wiring to the module, and connect the cables correctly. Connecting a power supply with a different voltage rating or incorrect wiring may cause fire or failure.
- Connectors for external devices must be crimped or pressed with the tool specified by the manufacturer, or must be correctly soldered. Incomplete connections may cause short circuit, fire, or malfunction.
- Securely connect the connector to the module. Poor contact may cause malfunction.
- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 100mm or more between them. Failure to do so may result in malfunction due to noise.
- Place the cables in a duct or clamp them. If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact. Do not clamp the extension cables with the jacket stripped.
- Check the interface type and correctly connect the cable. Incorrect wiring (connecting the cable to an incorrect interface) may cause failure of the module and external device.
- Tighten the terminal screws or connector screws within the specified torque range. Undertightening can cause drop of the screw, short circuit, fire, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, fire, or malfunction.
- When disconnecting the cable from the module, do not pull the cable by the cable part. For the cable with connector, hold the connector part of the cable. For the cable connected to the terminal block, loosen the terminal screw. Pulling the cable connected to the module may result in malfunction or damage to the module or cable.
- Prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter can cause a fire, failure, or malfunction.
- A protective film is attached to the top of the module to prevent foreign matter, such as wire chips, from entering the module during wiring. Do not remove the film during wiring. Remove it for heat dissipation before system operation.
- Programmable controllers must be installed in control panels. Connect the main power supply to the power supply module in the control panel through a relay terminal block. Wiring and replacement of a power supply module must be performed by qualified maintenance personnel with knowledge of protection against electric shock. For wiring, refer to Page 80 Wiring in this manual.
- For Ethernet cables to be used in the system, select the ones that meet the specifications in the user's manual for the module used. If not, normal data transmission is not guaranteed.

[Wiring Precautions]

⚠CAUTION

[Precautions for using channel isolated analog-digital converter modules, channel isolated digital-analog converter modules, and channel isolated RTD input modules]

- Individually ground the shielded cables of the programmable controller with a ground resistance of 100 ohms or less. Failure to do so may result in electric shock or malfunction.

[Precautions for using channel isolated thermocouple input modules]

- Individually ground the shielded cables of the programmable controller with a ground resistance of 100 ohms or less. Failure to do so may result in electric shock or malfunction.
- Do not place the module near a device that generates magnetic noise.

[Precautions for using high-speed counter modules]

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 150mm or more between them. Failure to do so may result in malfunction due to noise.
- Ground the shield cable on the encoder side (relay box) with a ground resistance of 100 ohm or less. Failure to do so may cause malfunction.

[Precautions for using CC-Link IE Controller Network (when optical fiber cables are used)]

- For optical fiber cables to be used in the system, select the ones that meet the specifications in the MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup). If not, normal data transmission is not guaranteed.

[Precautions for using CC-Link system master/local modules]

- Use Ver.1.10-compatible CC-Link dedicated cables in a CC-Link system. If not, the performance of the CC-Link system is not guaranteed. For the station-to-station cable length and the maximum overall cable length, follow the specifications in the MELSEC iQ-R CC-Link System Master/Local Module User's Manual (Startup). If not, normal data transmission is not guaranteed.

[Startup and Maintenance Precautions]

⚠WARNING

- Do not touch any terminal while power is on. Doing so will cause electric shock or malfunction.
- Correctly connect the battery connector. Do not charge, disassemble, heat, short-circuit, solder, or throw the battery into the fire. Also, do not expose it to liquid or strong shock. Doing so will cause the battery to produce heat, explode, ignite, or leak, resulting in injury and fire.
- Shut off the external power supply (all phases) used in the system before cleaning the module or retightening the terminal screws, connector screws, or module fixing screws. Failure to do so may result in electric shock.

[Startup and Maintenance Precautions]

⚠CAUTION

- When connecting an external device with a CPU module or intelligent function module to modify data of a running programmable controller, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents.
- Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.
- Do not disassemble or modify the modules. Doing so may cause failure, malfunction, injury, or a fire.
- Use any radio communication device such as a cellular phone or PHS (Personal Handy-phone System) more than 25cm away in all directions from the programmable controller. Failure to do so may cause malfunction.
- Shut off the external power supply (all phases) used in the system before mounting or removing the module. Failure to do so may cause the module to fail or malfunction.
- Tighten the screws within the specified torque range. Undertightening can cause drop of the component or wire, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- After the first use of the product, do not mount/remove the module to/from the base unit, and the terminal block to/from the module, and do not insert/remove the extended SRAM cassette to/from the CPU module more than 50 times (IEC 61131-2 compliant) respectively. Exceeding the limit may cause malfunction.
- After the first use of the product, do not insert/remove the SD memory card to/from the CPU module more than 500 times. Exceeding the limit may cause malfunction.
- Do not touch the metal terminals on the back side of the SD memory card. Doing so may cause malfunction or failure of the module.
- Do not touch the integrated circuits on the circuit board of an extended SRAM cassette. Doing so may cause malfunction or failure of the module.
- Do not drop or apply shock to the battery to be installed in the module. Doing so may damage the battery, causing the battery fluid to leak inside the battery. If the battery is dropped or any shock is applied to it, dispose of it without using.
- Startup and maintenance of a control panel must be performed by qualified maintenance personnel with knowledge of protection against electric shock. Lock the control panel so that only qualified maintenance personnel can operate it.
- Before handling the module, touch a conducting object such as a grounded metal to discharge the static electricity from the human body. Failure to do so may cause the module to fail or malfunction.

[Startup and Maintenance Precautions]

⚠CAUTION

[Precautions for using positioning modules, Motion CPU modules, and Simple Motion modules]

- Before testing the operation, set a low speed value for the speed limit parameter so that the operation can be stopped immediately upon occurrence of a hazardous condition.
- Confirm and adjust the program and each parameter before operation. Unpredictable movements may occur depending on the machine.

[Precautions for using Motion CPU modules and Simple Motion modules]

- When using the absolute position system function, on starting up, and when the module or absolute value motor has been replaced, always perform a home position return.
- Before starting the operation, confirm the brake function.
- Do not perform a megger test (insulation resistance measurement) during inspection.
- After maintenance and inspections are completed, confirm that the position detection of the absolute position detection function is correct.
- Lock the control panel and prevent access to those who are not certified to handle or install electric equipment.

[Operating Precautions]

⚠CAUTION

- When changing data and operating status, and modifying program of the running programmable controller from an external device such as a personal computer connected to an intelligent function module, read relevant manuals carefully and ensure the safety before operation. Incorrect change or modification may cause system malfunction, damage to the machines, or accidents.
- Do not power off the programmable controller or reset the CPU module while the setting values in the buffer memory are being written to the flash ROM in the module. Doing so will make the data in the flash ROM undefined. The values need to be set in the buffer memory and written to the flash ROM again. Doing so can cause malfunction or failure of the module.

[Precautions for using positioning modules, Motion CPU modules, and Simple Motion modules]

- Note that when the reference axis speed is specified for interpolation operation, the speed of the partner axis (2nd, 3rd, or 4th axis) may exceed the speed limit value.
- Do not go near the machine during test operations or during operations such as teaching. Doing so may lead to injuries.

[Disposal Precautions]

⚠CAUTION

- When disposing of this product, treat it as industrial waste.
- When disposing of batteries, separate them from other wastes according to the local regulations. For details on battery regulations in EU member states, refer to Page 136 Disposal precautions in this manual.

[Transportation Precautions]

⚠CAUTION

- When transporting lithium batteries, follow the transportation regulations. For details on the regulated models, refer to Page 135 Transport guidelines in this manual.
- The halogens (such as fluorine, chlorine, bromine, and iodine), which are contained in a fumigant used for disinfection and pest control of wood packaging materials, may cause failure of the product. Prevent the entry of fumigant residues into the product or consider other methods (such as heat treatment) instead of fumigation. The disinfection and pest control measures must be applied to unprocessed raw wood.

CONDITIONS OF USE FOR THE PRODUCT

(1) Mitsubishi programmable controller ("the PRODUCT") shall be used in conditions;
i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and
ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.
MITSUBISHI SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI'S USER, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.
("Prohibited Application")
Prohibited Applications include, but not limited to, the use of the PRODUCT in;
- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

Notwithstanding the above, restrictions Mitsubishi may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by Mitsubishi and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTs are required. For details, please contact the Mitsubishi representative in your region.

INTRODUCTION

Thank you for purchasing the Mitsubishi MELSEC iQ-R series programmable controllers.
This manual describes the system configuration, specifications, installation, wiring, maintenance, and inspection of MELSEC iQ-R series programmable controllers.
Before using this product, please read this manual and the relevant manuals carefully and develop familiarity with the functions and performance of the MELSEC iQ-R series programmable controller to handle the product correctly.
When applying the program and circuit examples provided in this manual to an actual system, ensure the applicability and confirm that it will not cause system control problems.
Please make sure that the end users read this manual.

Point

When using the C Controller module, reading this manual and relevant manuals requires the replacement of the following terms:
- "Programmable controller" and "Programmable controller CPU" → "C Controller module"
- "Programmable controller system" → "C Controller system"

Where a reference to the GX Works3 Operating Manual or the MELSEC iQ-R CPU Module User's Manual (Startup or Application) is given, the reference should be made to the following instead:
📖 CW Configurator Operating Manual
📖 MELSEC iQ-R C Controller Module User's Manual (Startup)
📖 MELSEC iQ-R C Controller Module User's Manual (Application)

CONTENTS

TERMS

Unless otherwise specified, this manual uses the following terms.

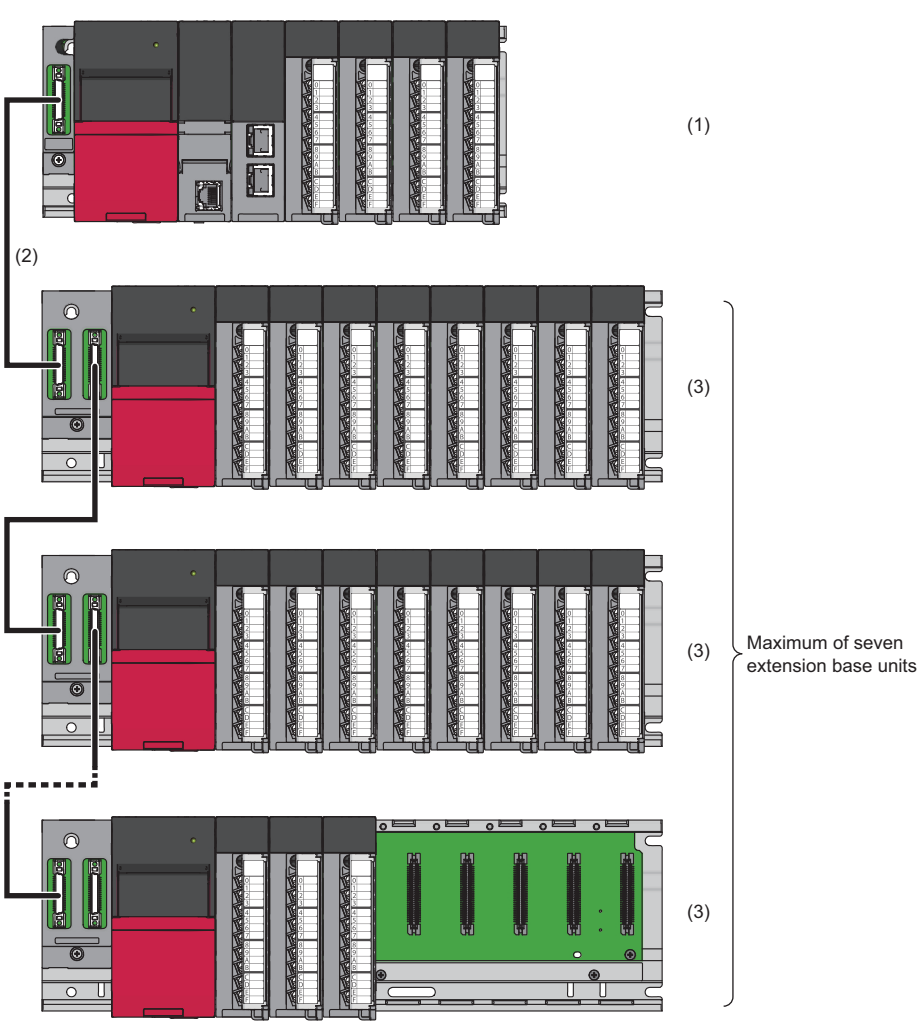
Term	Description
Base unit	A generic term for a main base unit, extension base unit, and RQ extension base unit
C Controller module	A generic term for the MELSEC iQ-R series C Controller module
CC-Link IE	A generic term for CC-Link IE Controller Network and CC-Link IE Field Network
CC-Link IE Controller Network-equipped module	A generic term for the RJ71GP21-SX CC-Link IE Controller Network module and RJ71EN71 (when the CC-Link IE Controller Network function is used)
CC-Link IE Field Network-equipped master/local modules	A generic term for the RJ71GF11-T2 CC-Link IE Field Network master/local module and the RJ71EN71 (when the CC-Link IE Field Network function is used)
Control CPU	A CPU module that controls connected I/O modules and intelligent function modules. In a multiple CPU system, there are multiple CPU modules and each connected module can be controlled by a different CPU module.
CPU module	A generic term for the MELSEC iQ-R series CPU module
Dedicated instruction	An instruction that simplifies programming for using functions of modules
Engineering tool	The product name of the software package for the MELSEC programmable controllers
Ethernet interface module with built-in CC-Link IE	Another term for the RJ71EN71
Extension base unit	The abbreviation for the MELSEC iQ-R series extension base unit
Extension cable	The abbreviation for the MELSEC iQ-R series extension cables
I/O module	A generic term for an input module, output module, I/O combined module, and interrupt module
Intelligent function module	A module that has functions other than input and output, such as an A/D converter module and D/A converter module
Main base unit	The abbreviation for the MELSEC iQ-R series main base unit
Multiple CPU system	A system where multiple CPU modules (2 to 4 modules) control I/O modules or intelligent function modules that are assigned to each CPU module
Network module	A generic term for the following modules: • Ethernet interface module • CC-Link IE Controller Network module • A module on CC-Link IE Field Network • MELSECNET/H module • MELSECNET/10 module
Power supply module	The abbreviation for the MELSEC iQ-R series power supply module
Process CPU	A generic term for the R08PCPU, R16PCPU, R32PCPU, and R120PCPU
Programmable controller CPU	A generic term for the R04CPU, R08CPU, R16CPU, R32CPU, and R120CPU
Q5□B	The abbreviation for the MELSEC-Q series extension base unit that does not require a power supply module
Q6□B	The abbreviation for the MELSEC-Q series extension base unit that requires a power supply module
Relay station	A station that includes two or more network modules. Data are passed through this station to stations on other networks
RQ extension base unit	The abbreviation for the MELSEC iQ-R series extension base unit
Single CPU system	A system where one CPU module controls an I/O module or intelligent function module
Slave station	A generic term for a local station, remote I/O station, remote device station, and intelligent device station on CC-Link IE Field Network

1 SYSTEM CONFIGURATION

This chapter describes the MELSEC iQ-R series system configuration.

1.1 Overall Configuration

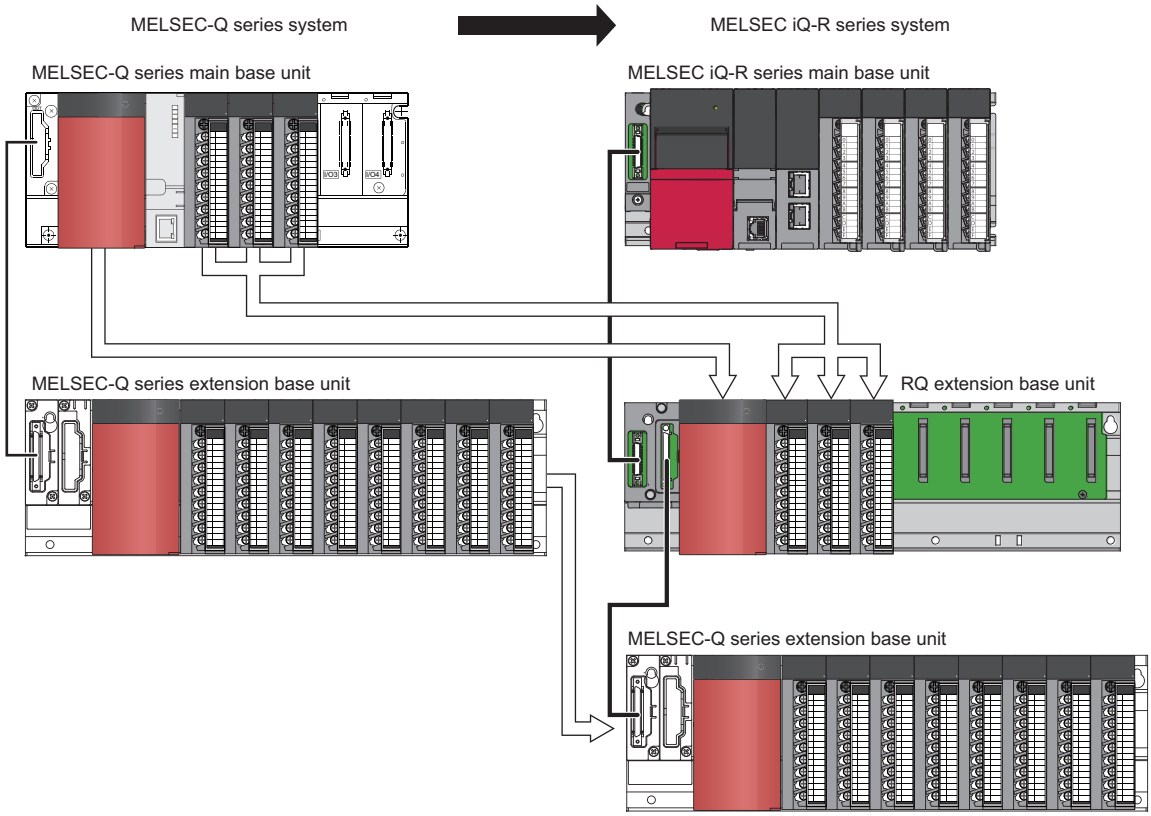
The MELSEC iQ-R series system is configured by mounting a module on a base unit.
A power supply module is mounted on the power supply slot at the left end of a main base unit and a CPU module is mounted on the CPU slot at the right of the power supply slot. Modules other than the power supply module are mounted on the slots at the right from the CPU slot.



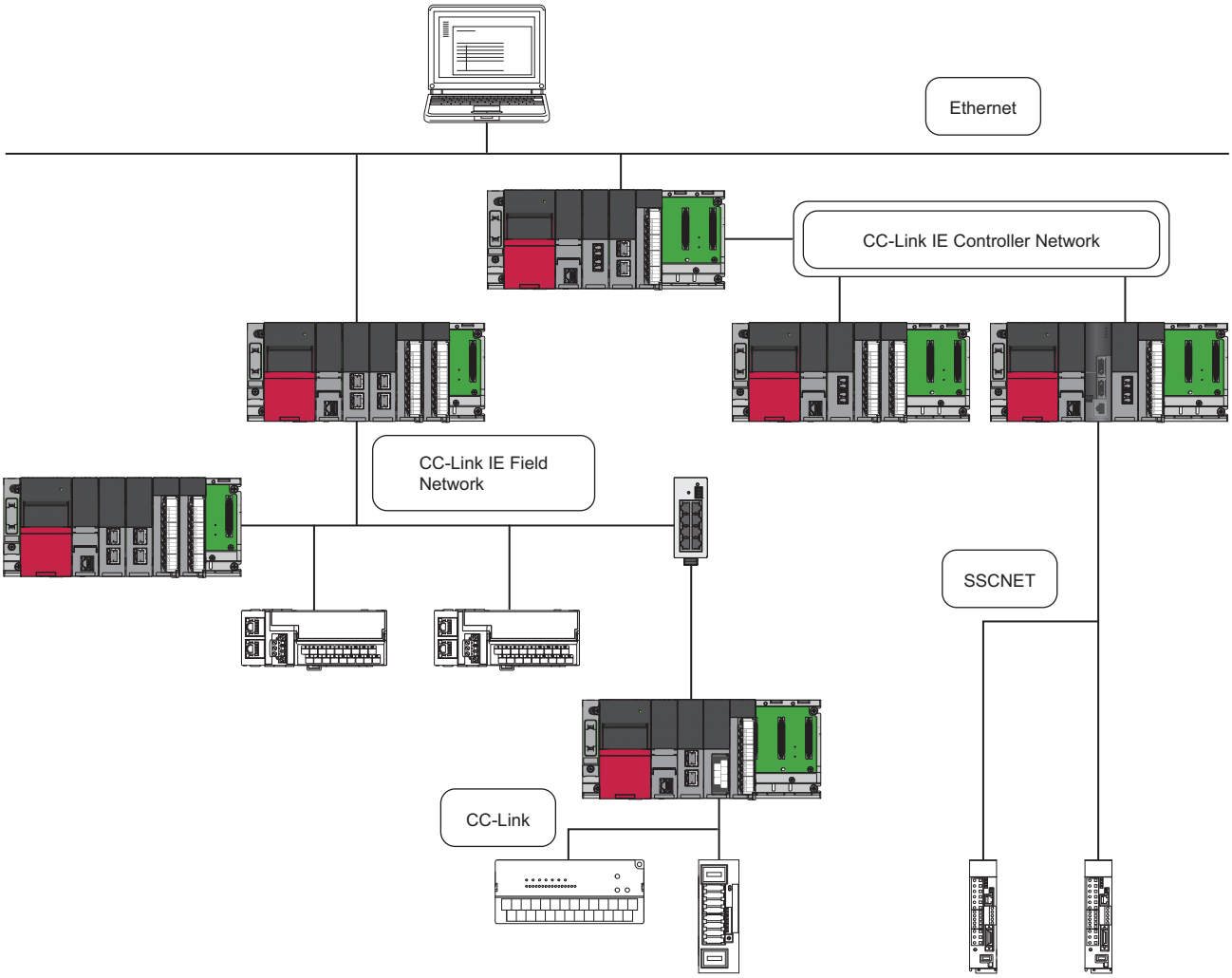
(1) Main base unit
(2) Extension cable
(3) Extension base unit

Point

A MELSEC-Q series module and base unit can be used by connecting the RQ extension base unit in the MELSEC iQ-R series system. (☞ Page 71 Connection Method for the Extension Base Unit)
MELSEC-Q series power supply modules, I/O modules, and intelligent function modules can be mounted on the RQ extension base unit. (☞ Page 46 RQ extension base unit (for MELSEC-Q series modules))
Using the RQ extension base unit makes it possible to reuse the existing Q series system as shown below.



The network provides a seamless data communication across various levels, from the production control of all automation down to a device such as a sensor.

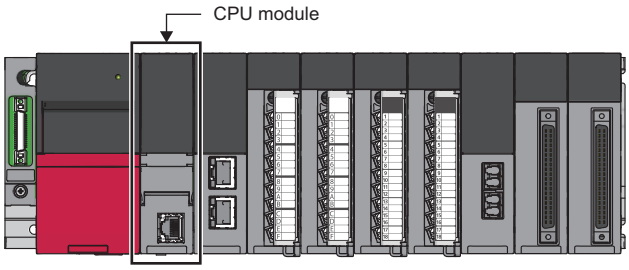


- Without being aware of layers and boundaries of the network, access to the production control system, programmable controllers, and other devices is possible in a seamless and identical manner. Device monitoring and data collection are easy to perform from anywhere.
- CC-Link IE is the network with a large capacity and a high speed of 1 Gbps. The 1 Gbps broad bandwidth which is divided into two parts, one for control communications and the other for information communications, ensures the time reliability of control communications and achieves a real-time data collection, which is not allowed via TCP/IP.
- CC-Link is a globally standardized open field network. Flexible support for a multi-vendor environment allows a rich variety of more than 1000 partner products to be connected to the MELSEC iQ-R series.
- SSCNET is a synchronous motion network that supports optical network and offers high speed and high reliability.

The system is classified into the following by the number of mounted CPU modules.

Single CPU system

This system controls an I/O module and intelligent function module using a CPU module mounted on a main base unit.



Multiple CPU system

This system requires multiple CPU modules, and each module controls an I/O module and intelligent function module. (☞ Page 42 Control CPU)

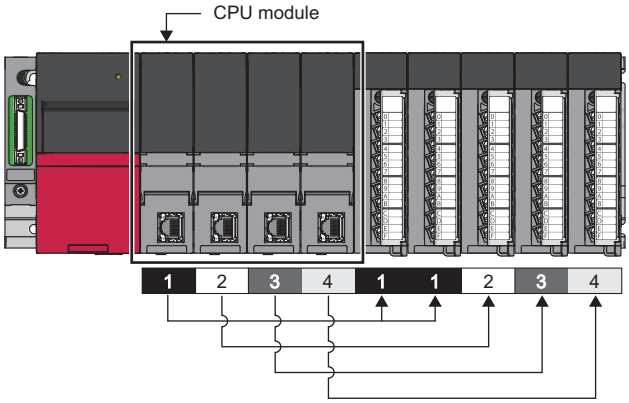
Configure the multiple CPU system in the following cases.

- To execute the high-accuracy motion control by using a Motion CPU in a system
- To shorten the scan time of the entire system by distributing the control of an I/O module and intelligent function module with multiple CPU modules

The CPU module is mounted on a main base unit only, and maximum of four CPU modules can be mounted. (☞ Page 27 Combinations of CPU modules on the multiple CPU system, Page 40 CPU Numbers)

For details on the multiple CPU system function, refer to the following.

📖 MELSEC iQ-R CPU Module User's Manual (Application)



System configuration specifications, configuration devices, and software

This chapter describes the overview of the MELSEC iQ-R series system configuration.

When using the C Controller module, refer to the following.

(📖 MELSEC iQ-R C Controller Module User's Manual (Startup))

System configuration specifications

Item		Description
Mounting position of a module		Slot number 0 to 63
Maximum number of mountable modules	Single CPU system	64*1*3
	Multiple CPU system	57 to 63*1*2*3
Maximum number of extension base units		7*4
Overall extension cable distance		20m*5

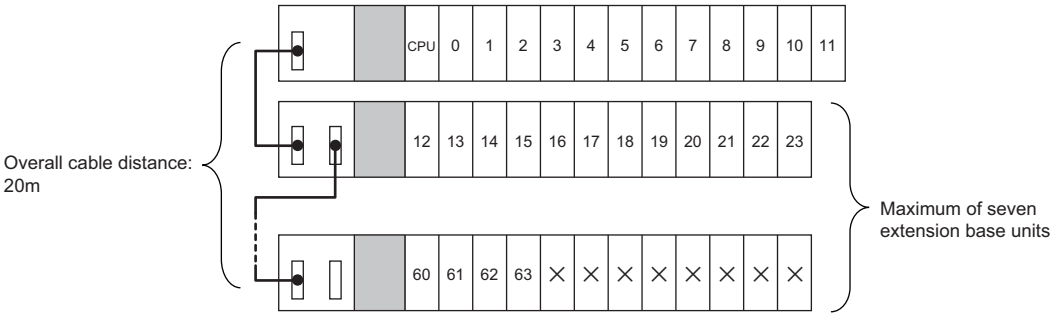
*1 Mount modules within the range of the number of I/O points for the CPU module used. (📖 MELSEC iQ-R CPU Module User's Manual (Startup))
The number of I/O points can be checked on the engineering tool. (📖 GX Works3 Operating Manual)

*2 Modules can be mounted up to slot number 63 starting from the next slot where is mounted the CPU module at the right end. For example, when four CPU modules are mounted on the CPU slot and slot number 0 to 2, the maximum number of mountable modules is 61.

*3 The number of mountable modules includes the empty slots. Even if the number of I/O points is set zero point for an empty slot, the slot is counted as one module.

*4 This number is total of the extension base units, RQ extension base units, and MELSEC-Q series extension base units.

*5 When a MELSEC-Q series module is used in the system, the overall cable distance is 13.2m.



- Shaded areas show the power supply modules.
- CPU and the numbers in the above figure show the CPU slot and slot numbers.
- Modules cannot be mounted on ×.

Lists of configuration devices

The following table lists configuration devices in the MELSEC iQ-R series system.

■MELSEC iQ-R series

Module		Model
Base unit	Main base unit	R35B, R38B, R312B
	Extension base unit	R65B, R68B, R612B
	RQ extension base unit	RQ65B, RQ68B, RQ612B
Extension cable		RC06B, RC12B, RC30B, RC50B
Power supply module		R61P, R62P, R63P, R64P
CPU module	Programmable controller CPU	R04CPU, R08CPU, R16CPU, R32CPU, R120CPU
	Process CPU	R08PCPU, R16PCPU, R32PCPU, R120PCPU
	Motion CPU	R16MTCPU, R32MTCPU
	C Controller module	R12CCPU-V
Memory extension	SD memory card	NZ1MEM-2GBSD, NZ1MEM-4GBSD, NZ1MEM-8GBSD, NZ1MEM-16GBSD, L1MEM-2GBSD, L1MEM-4GBSD
	Extended SRAM Cassette	NZ2MC-1MBS, NZ2MC-2MBS, NZ2MC-4MBS, NZ2MC-8MBS, NZ2MC-8MBSE
Battery		Q6BAT, Q7BAT(-SET)
I/O module	AC input module	RX10
	DC input module	RX40C7, RX41C4, RX42C4
	Contact output module	RY10R2
	Transistor output module	RY40NT5P, RY41NT2P, RY42NT2P, RY40PT5P, RY41PT1P, RY42PT1P
	I/O combined module	RH42C4NT2P
Intelligent function module	Analog-digital converter module	R60AD4, R60ADI8, R60ADV8
	Channel isolated analog-digital converter module	R60AD8-G, R60AD16-G*2
	Digital-analog converter module	R60DA4, R60DAI8, R60DAV8
	Channel isolated digital-analog converter module	R60DA8-G, R60DA16-G*2
	Simple motion module	RD77MS2, RD77MS4, RD77MS8, RD77MS16
	Channel isolated RTD input module	R60RD8-G
	Channel isolated thermocouple input module	R60TD8-G
	High-speed counter module	RD62P2, RD62D2, RD62P2E
	Positioning module	RD75P2, RD75P4, RD75D2, RD75D4
	Ethernet	RJ71EN71
	CC-Link IE Field Network	RJ71GF11-T2, RJ71EN71
	CC-Link IE Controller Network	RJ71GP21-SX, RJ71EN71*1
	CC-Link	RJ61BT11
	Serial communication	RJ71C24, RJ71C24-R2, RJ71C24-R4
Blank cover module		RG60

*1 When the CC-Link IE Controller Network function is used with the RJ71EN71, there are restrictions on the firmware version of the programmable controller CPU and the RJ71EN71 (📖 Manual for each module). Note that the function cannot be used with the Process CPU.

*2 These modules take up two slots. When used with the programmable controller CPU, there are restrictions on the firmware version of the programmable controller CPU (📖 MELSEC iQ-R CPU Module User's Manual (Application)).

■MELSEC-Q series

The following table lists the MELSEC-Q series modules and extension cables which can be used in the MELSEC iQ-R series system.

When a MELSEC-Q series module is used, refer to the following.

☞ Page 102 How to Use MELSEC-Q Series Modules

Module		Model
Base unit	Extension base unit	Q52B, Q55B, Q63B, Q65B, Q68B, Q612B
	Q series large type extension base unit	Q55BL, Q65BL, Q68BL
	Q series large type extension base unit (AnS series size)	Q55BLS, Q65BLS, Q68BLS, Q55BLS-D, Q65BLS-D, Q68BLS-D
Extension cable		QC05B, QC06B, QC12B, QC30B, QC50B, QC100B
Power supply module		Q61P, Q61P-A1, Q61P-A2, Q62P, Q63P, Q64P, Q64PN, Q61P-D
I/O module	AC input module	QX10, QX10-TS, QX28
	DC input module	QX40, QX40-TS, QX40-S1, QX41, QX41-S1, QX41-S2, QX42, QX42-S1, QX70, QX71, QX72, QX80, QX80-TS, QX81, QX81-S2, QX82, QX82-S1
	DC high-speed input module	QX40H, QX70H, QX80H, QX90H
	AC/DC input module	QX50
	Contact output module	QY10, QY10-TS, QY18A
	Triac output module	QY22
	Transistor output module	QY40P, QY40P-TS, QY41P, QY42P, QY50, QY68A, QY70, QY71, QY80, QY80-TS, QY81P, QY82P
	Transistor high-speed output module	QY41H
	I/O combined module	QH42P, QX48Y57, QX41Y41P
	Interrupt module	QI60
	Large type AC input module	QX11L, QX21L
	Large type contact output module	QY11AL, QY13L
	Large type triac output module	QY23L
	Large type transistor output module	QY51PL

Module		Model
Intelligent function module	Analog-digital converter module	Q64AD, Q68ADV, Q68ADI
	Channel isolated high resolution analog-digital converter module	Q64AD-GH
	channel isolated high resolution analog-digital converter module (with signal conditioning function)	Q62AD-DGH
	Channel isolated analog-digital converter module	Q68AD-G
	Channel isolated analog-digital converter module (with signal conditioning function)	Q66AD-DG
	High speed analog-digital converter module	Q64ADH
	Digital-analog converter module	Q62DA, Q62DAN, Q64DA, Q64DAN, Q68DAV, Q68DAVN, Q68DAI, Q68DAIN
	Channel isolated digital-analog converter module	Q62DA-FG, Q66DA-G
	High speed digital-analog converter module	Q64DAH
	Analog input/output module	Q64AD2DA
	Load cell input module	Q61LD
	Current transformer input module	Q68CT
	RTD input module	Q64RD
	Channel isolated RTD input module	Q64RD-G, Q68RD3-G
	Thermocouple input module	Q64TD
	Channel isolated thermocouple/micro voltage input module	Q64TDV-GH
	Channel isolated thermocouple input module	Q68TD-G-H01, Q68TD-G-H02
	Temperature control module	Q64TCTTN, Q64TCRTN, Q64TCTTBWN, Q64TCRTBWN
	Loop control module	Q62HLC
	Multichannel high-speed counter module	QD63P6
	4Mpps capable high-speed counter module	QD64D2
	Channel isolated pulse input module	QD60P8-G
	Multi function counter/timer module	QD65PD2
	Positioning module	QD70P4, QD70P8, QD70D4, QD70D8, QD73A1
	Positioning module with built-in counter function	QD72P3C3
	MES interface module	QJ71MES96
	Web server module	QJ71WS96
	CC-Link/LT master module	QJ61CL12
	AnyWire DB A20 master module	QJ51AW12D2
	MODBUS®/TCP interface module	QJ71MT91
	MODBUS® interface module	QJ71MB91
	FL-net (OPCN-2) interface module	QJ71FL71, QJ71FL71-T, QJ71FL71-B2, QJ71FL71-B5, QJ71FL71-F01, QJ71FL71-T-F01, QJ71FL71-B2-F01, QJ71FL71-B5-F01
	AS-i master module	QJ71AS92
	Intelligent communication module	QD51, QD51-R24
	DeviceNet master-slave module	QJ71DN91
	AnyWireASLINK master module	QJ51AW12AL
	Energy measuring module	QE81WH, QE84WH, QE81WH4W, QE83WH4W
	Insulation monitoring module	QE82LG
Blank cover module	Blank cover	QG60
	Large type blank cover	QG69L
	Q series large type blank cover (AnS series size)	QG69LS

Software

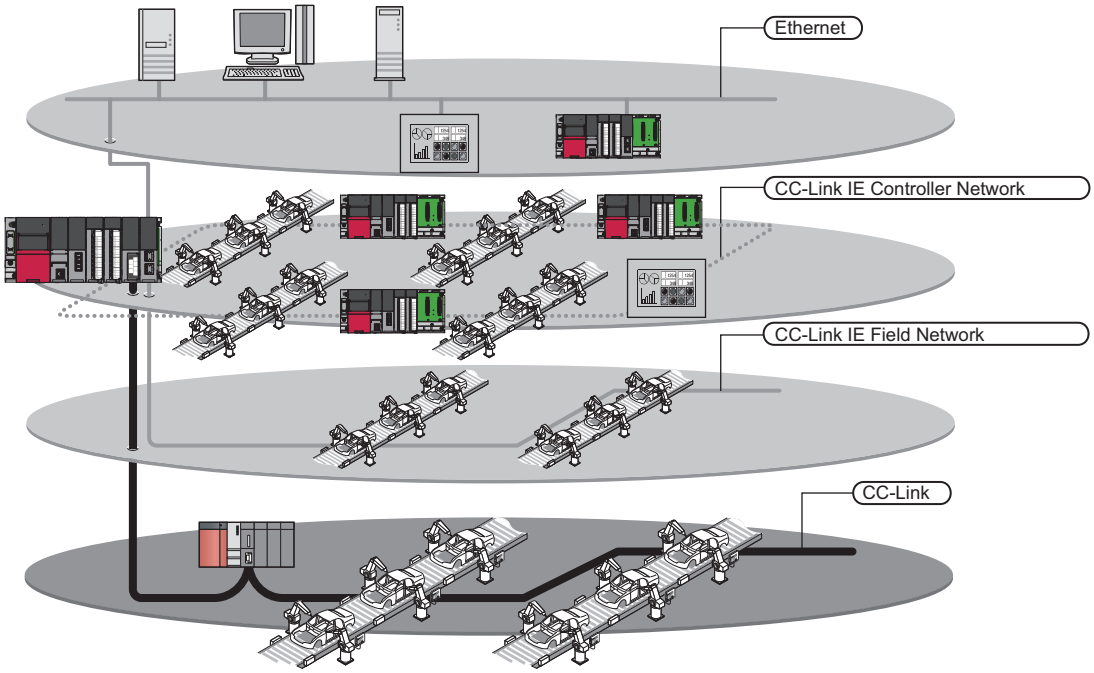
The following software can be used for the MELSEC iQ-R series system. (📖Manual for each software used)

Software	Function and application
iQ Works Version 2	A package software integrated the various software such as a programmable controller, motion controller, and GOT
GX Works3	A software for a system design, programming, debug, and maintenance of a programmable controller

Communications between systems

The system that a programmable controller system communicates with other systems seamlessly can be configured by using the network such as Ethernet and CC-Link IE.
Other series network can be connected by setting relay stations with multiple modules of difference network.

Ex.



For the network module which can be used in the MELSEC iQ-R series system, refer to the following.
☞ Page 21 Lists of configuration devices

1.2 Precautions for System Configuration

This section describes precautions for configuring a system.

When using the C Controller module, refer to the following.

(📖 MELSEC iQ-R C Controller Module User's Manual (Startup))

Modules having the restriction of the number of mountable modules

This section describes modules having the restriction of the number of mountable modules.

MELSEC iQ-R series modules

Module	Model	Maximum number of mountable modules	
		Single CPU system	Multiple CPU system
CC-Link IE Controller Network-equipped module	• RJ71GP21-SX • RJ71EN71*4	8	32 (One CPU module can control eight modules.)
CC-Link IE Field Network-equipped master/local module*1	• RJ71GF11-T2 • RJ71EN71*3	8	32 (One CPU module can control eight modules.)
CC-Link module*1*2	• RJ61BT11	8	32 (One CPU module can control eight modules.)

*1 There is no restriction when parameters are set using the dedicated instruction after "Program" in "System Parameter" is selected.

*2 Use three network modules (RJ71GP21-SX, RJ71GF11-T2, and RJ71EN71 (when the CC-Link IE Field Network function is used)) or less per CPU module at the automatic CC-Link startup.

*3 There are the restrictions when the CC-Link IE Field Network function is used.

*4 There are the restrictions when the CC-Link IE Controller Network function is used.

MELSEC-Q series modules

Module	Model	Maximum number of mountable modules	
		Single CPU system	Multiple CPU system
Interrupt module*1	• QI60	1	4 (One CPU module can control one module.)
Input module*1*2	• QX40H • QX70H • QX80H • QX90H	1	4 (One CPU module can control one module.)

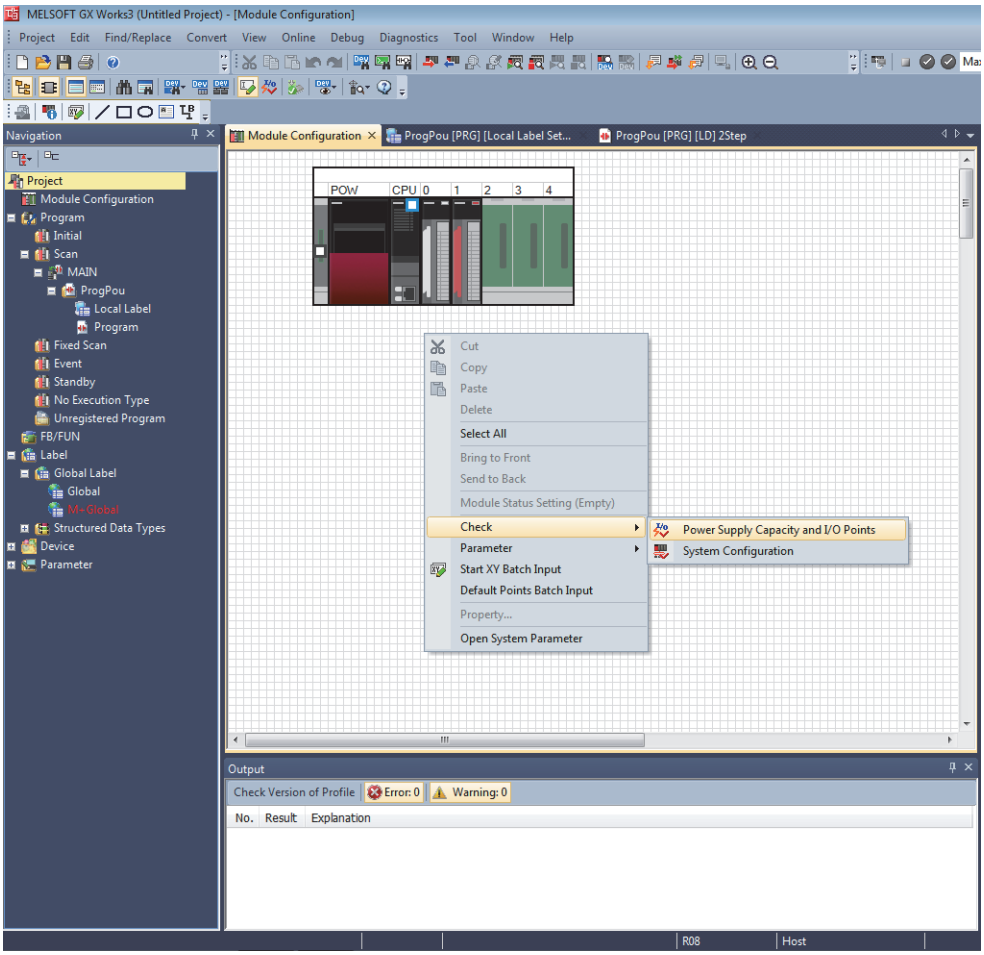
*1 There are the restrictions when parameters are not set in "I/O Assignment Setting" of "System Parameter". There is no restriction when parameters are set in "I/O Assignment Setting".

*2 There are the restrictions when the input module is shifted to an interrupt module by turning off the function selection switch (SW2).

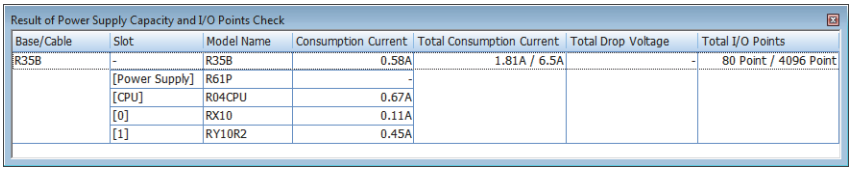
Consideration for internal current consumption

Consider the system to be used so that the internal current consumption of the entire system is less than the rated output current of the power supply module.

The total can be checked by using the engineering tool as follows.



The following window shows the check result.



Base/Cable	Slot	Model Name	Consumption Current	Total Consumption Current	Total Drop Voltage	Total I/O Points
R35B	-	R35B	0.58A	1.81A / 6.5A	-	80 Point / 4096 Point
	[Power Supply]	R61P	-			
	[CPU]	R04CPU	0.67A			
	[0]	RX10	0.11A			
	[1]	RY10R2	0.45A			

Combinations of CPU modules on the multiple CPU system

Depending on what type of CPU module is set as CPU No.1, the CPU modules that can constitute the multiple CPU system vary.

The following table shows the possible combination of CPU modules and the number of mountable modules in configuring the multiple CPU system.

CPU module of CPU No.1	Number of mountable CPU modules of CPU No.2 or later			
	Programmable controller CPU	Process CPU	Motion CPU	C Controller module
Programmable controller CPU	0 to 3	0 to 3*1	0 to 3	0 to 3
Process CPU	0 to 3*1	0 to 3	0 to 3*1	Not supported
Motion CPU	Not supported	Not supported	Not supported	Not supported
C Controller module	0 to 3	Not supported	0 to 3	0 to 3

*1 Under the multiple CPU system configuration, online module change is not permitted.

2 ASSIGNMENT FOR MODULES

This chapter describes a slot number, I/O number, CPU number, and assignment for a control CPU.
The assignment can be set by mounting modules on "Module Configuration" in the engineering tool.
Reading out system parameters and the system configuration also can set the assignment. (📖 GX Works3 Operating Manual)
The following table lists the setting availability on "Module Configuration" or "System Parameter" for each setting item.

Item	Module Configuration	System Parameter
Base unit model	○	○
Power supply module model	○	○
Extension cable model	○	○
Module model	○	○
Module order	○	○
Module I/O number (☞ Page 32 I/O Numbers of Modules)	○	○
Module status setting (☞ Page 38 Module status setting)	○	○
Number of empty slots (☞ Page 37 I/O number of an empty slot)	○	○
Control CPU (☞ Page 42 Control CPU)	○	○
Number of slots of a base unit (☞ Page 30 Setting for any slot numbers)	×	○
Number of points of a module	×	○

Point

Use "Module Configuration" or "System Parameter" depending on the following application.

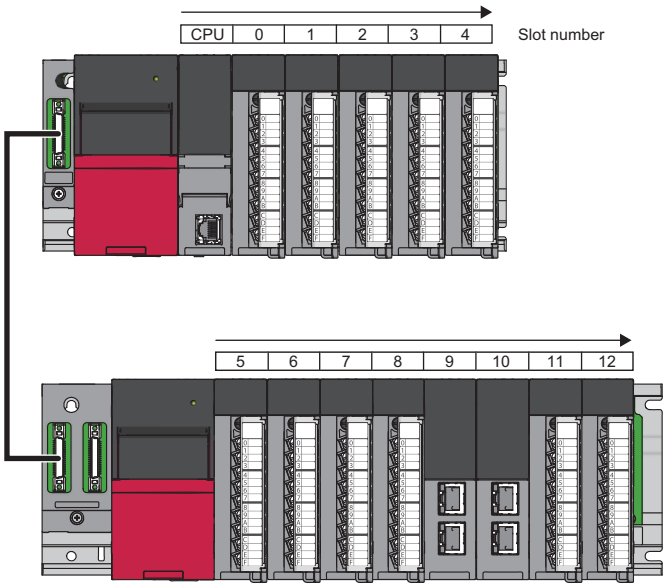
- Module Configuration: when the unique information of the module such as occupied points is used without change
- System Parameter: when the number of slot for the base unit or the number of occupied points is changed

2.1 Slot Numbers on a Base Unit

Slot numbers are assigned in serial number starting from the slot at the right of the CPU slot.

When a base unit is extended, a main base unit is assigned at the first level and extension base units are assigned at second to seventh level.

The MELSEC-Q series extension base unit is required the extension level setting with the connector pin for the extension level setting. (☞ Page 72 Setting method with connector pin for extension level setting)



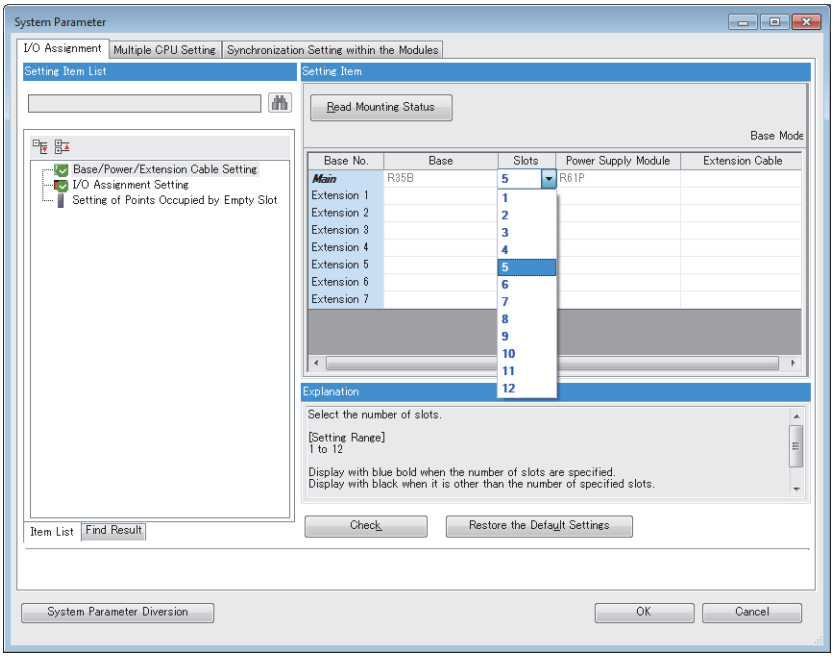
The module which occupied two slots is mounted, slot numbers for two modules are assigned.

Setting for any slot numbers

The number of slots for each base unit can be set the range of 1 to 12. Set the number of slots in the following cases.

- To secure slots to change into the base unit having the different number of slots for the future
- To not change the number of slots even if the base unit used in the existing system is changed

Navigation Window ⇨ [System Parameter] ⇨ [I/O Assignment Setting] ⇨ [Base/Power/Extension Cable Setting]



■When the number of set slots is more than the number of actual slots

Slots corresponding to the set number are occupied, where the rest slots after a set of actually mounted slots are empty slots.

Ex.

Assuming that five slots are used in the base unit and eight slots are set as the number of slots, the remained three slots are empty slots.

Point

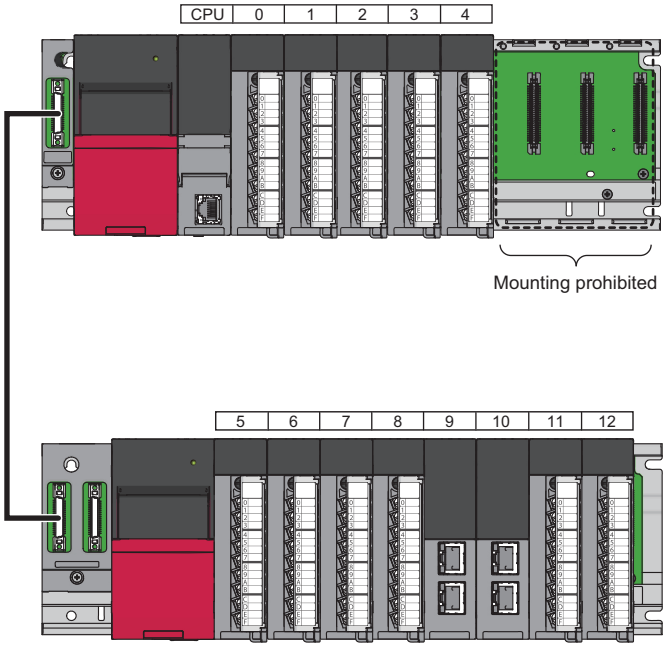
The number of empty slots can be changed in "Module Configuration", or "Setting of Points Occupied by Empty Slot" in the system parameters. (☞ Page 37 I/O number of an empty slot)

■When the number of set slots is less than the number of actual slots

Slots corresponding to the set number are occupied, where slots that are out of the set range are prohibited from mounting a module, and the slot number is not assigned.

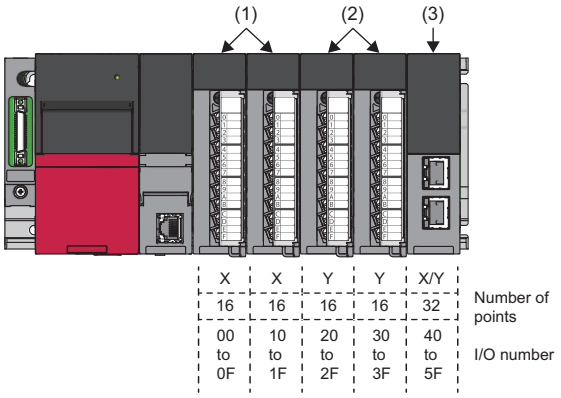
Ex.

Assuming that eight slots are used in the base unit and five slots are set as the number of slots, the excluded three slots are prohibited from use.



2.2 I/O Numbers of Modules

An I/O number is a hexadecimal assigned number for data communication with the CPU module through I/O modules and intelligent function modules. Input and output are used for exchanging ON/OFF data. The head of an I/O number is "X" for input, and "Y" for output.



(1) Input modules
(2) Output modules
(3)Intelligent function module

I/O numbers starting from 0H, which is given to the module just right to the CPU module, are automatically assigned in consecutive order.

In the extension base unit, assigned numbers start from the next number of the last I/O number in the main base unit.

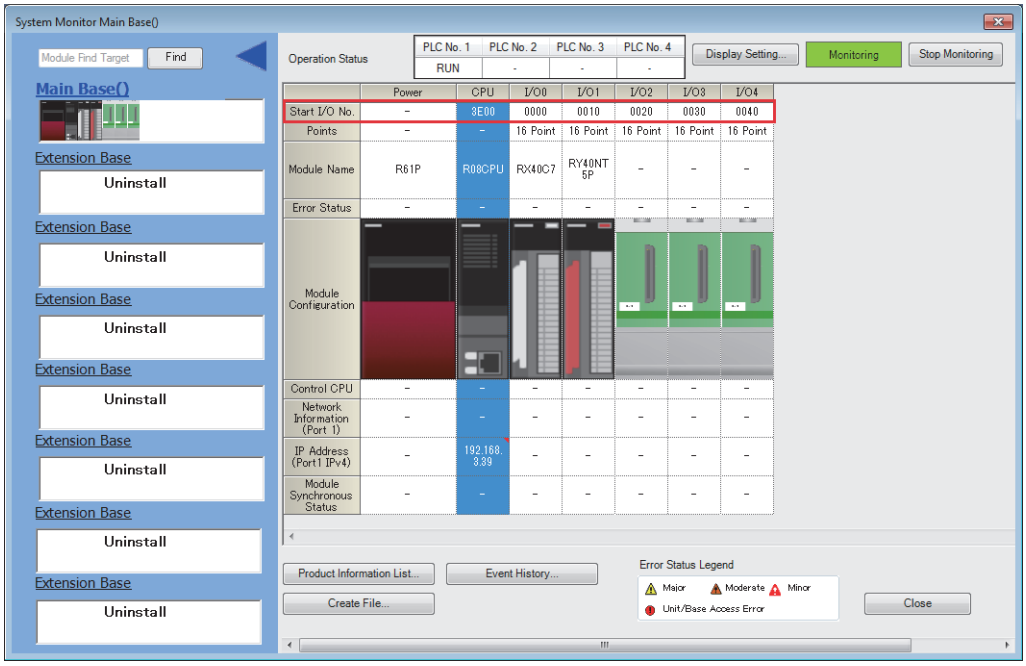
Each slot in the base unit occupies I/O numbers corresponding to the points of a module mounted.

On placing a module in "Module Configuration" in the engineering tool, the I/O numbers are automatically assigned according to the number of occupied points of the module.

Changing the module placement does not change the module I/O numbers once assigned.

Point

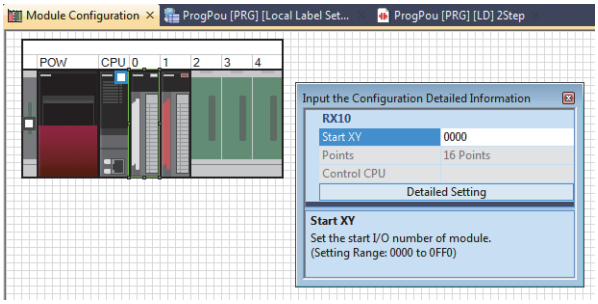
Open "System Monitor" in the engineering tool to check the mounted modules and their I/O numbers. (GX Works3 Operating Manual)



Setting any desired I/O numbers

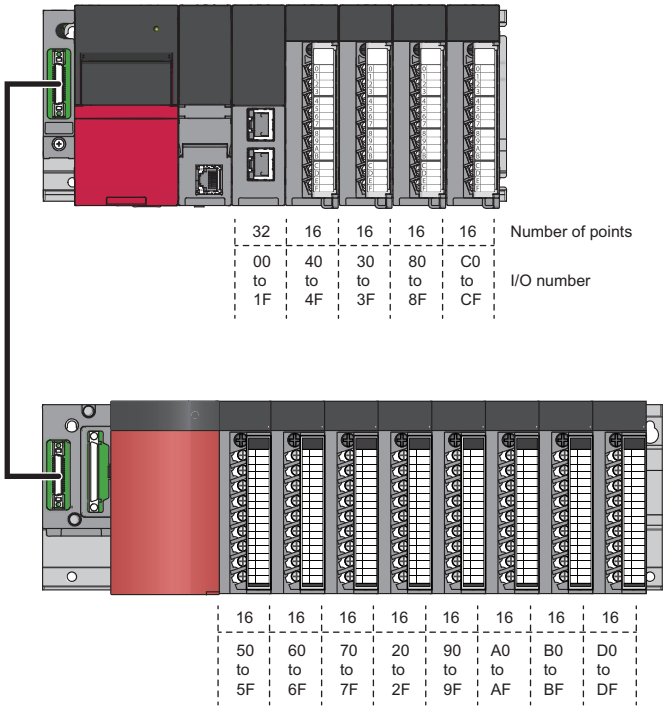
On placing a module in "Module Configuration", the I/O numbers are automatically assigned according to the number of occupied points of the module. In the following cases, however, change the I/O numbers on a module-by-module basis:

- Even if the module is changed to a module that has a different number of occupied points, it seems desirable to eliminate the need of the assignment modifications due to duplicated I/O numbers.
- When applying an already-existing program, I/O numbers are assigned to modules in just the same way in the program to reduce the program modifications.



Point

I/O numbers can be freely assigned beyond a boundary between the MELSEC iQ-R series and the MELSEC-Q series, being free from the restriction of assignment orders.



■Precautions

- The model name of a module needs to be set to the same model name of the mounted module.
- The CPU module that is not set as actually mounted denies access.
- For the module that permits changing the number of I/O points, set it in "I/O Assignment Setting" of "System Parameter".
- If the set number of I/O points differs from an actual mounting state, the modules operate as shown below:

Setting	Operation	Remarks
When the set number of points is less than the number of I/O points of mounted modules	The available number of points for the mounted I/O modules is reduced to the set number of points.	Intelligent function modules does not permit the setting of a fewer number of points.
When the set number of points is more than the number of I/O points of mounted modules	The extra number of points over the actual number of points is not used in the mounted I/O modules and intelligent function modules.	—

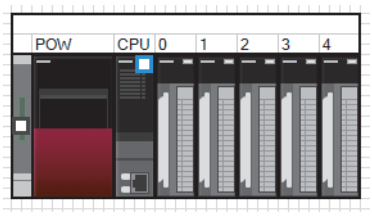
- Set "Module Configuration" as in the same system configuration actually used. Because the settings of the engineering tool control the module operation, a setting that is different from the actual configuration may result in unintended operation.
- For an arbitrary setting of I/O numbers, setting the I/O numbers to all the modules is recommended. I/O numbers of a module that is not set in the engineering tool are assigned following the I/O numbers of the module already set, which can cause duplication of I/O numbers.

Ex.

Duplication of I/O numbers as a result of setting the I/O numbers arbitrarily up to No.4 slot

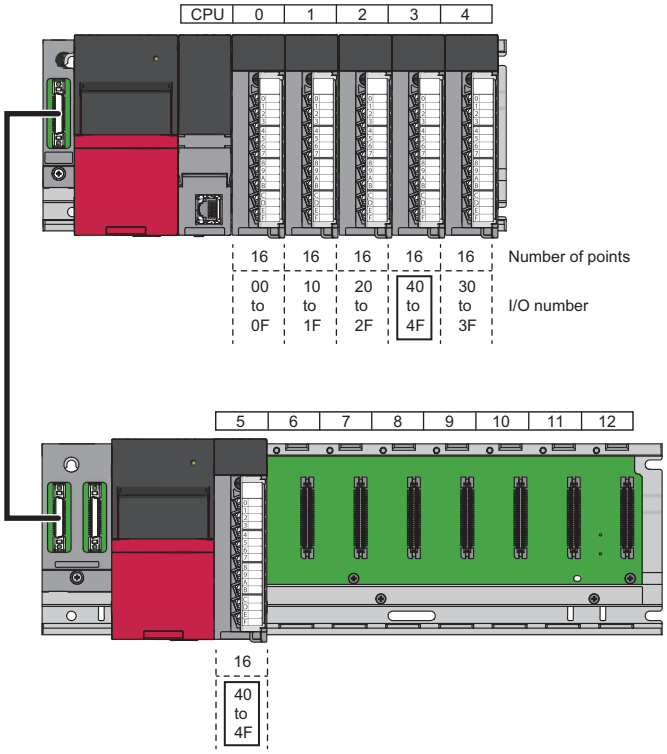
- Engineering tool

For the start I/O number, set 40 to a module of slot No.3 and set 30 to a module of slot No.4.

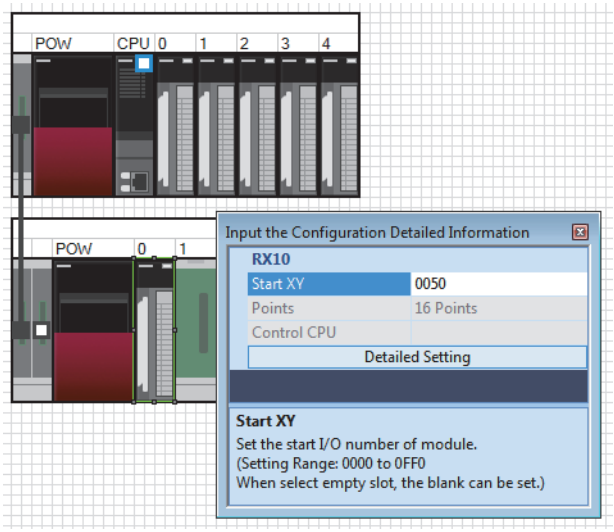


Slot	Module Name	Module Status Setting	Points	Start XY
Main				
CPU	R04CPU(Host Station)			3E00
0(0-0)	RX10	No Setting	16 Points	0000
1(0-1)	RX10	No Setting	16 Points	0010
2(0-2)	RX10	No Setting	16 Points	0020
3(0-3)	RX10	No Setting	16 Points	0040
4(0-4)	RX10	No Setting	16 Points	0030

• Mounting state



I/O numbers in slot No.5, which is not set in the engineering tool, are assigned following the I/O numbers in slot No.4, which result in duplication of I/O numbers.



Set the I/O numbers in slot No.5 to non-duplicated numbers by using the engineering tool.

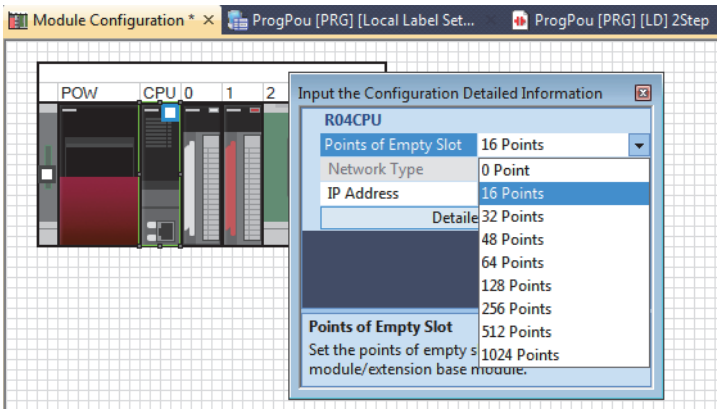
• To set the module reserved for future use, or when an already set module is not to be mounted, perform the module status setting. (☞ Page 38 Module status setting)

I/O number of an empty slot

An empty slot is a slot where a module is not mounted, and occupies 16 points by default.

Although this slot is empty, it allows setting up the I/O number and the number of points, both of which are reserved for future use.

The number of points can be changed for all empty slots at once by selecting the CPU module in "Module Configuration" as shown below.



Module status setting

The module status setting makes it possible to set the module status such as reserved status and disabled status, interpreting a configured module in the engineering tool as an empty slot.

The following table shows the application of the module status setting.

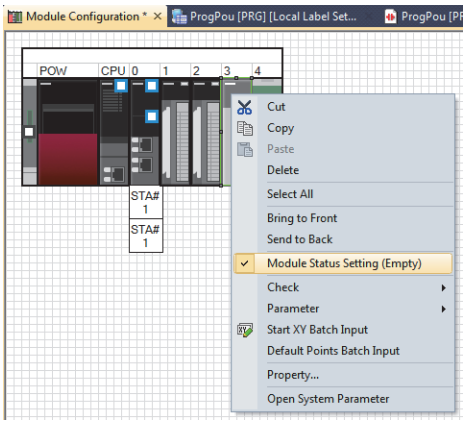
Status	Application
Reserved status	• To operate the module that is included in the module configuration of the engineering tool, but without actually mounting the module. • To allocate the I/O numbers of a module reserved for future use
Disabled status	• To make an actually mounted module stop the operation

The change of the parameter settings is not reflected in the module where the module status setting has been performed.

In addition, the following operations have no effect on the module where the module status setting has been performed:

- Setting a remote password
- Executing a program that accesses the module itself

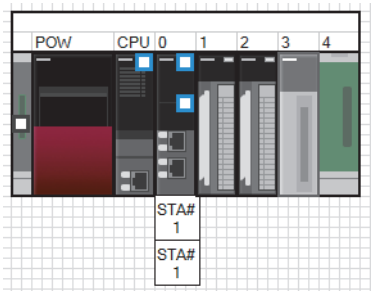
Perform the module status setting as shown below. (GX Works3 Operating Manual)



Ex.

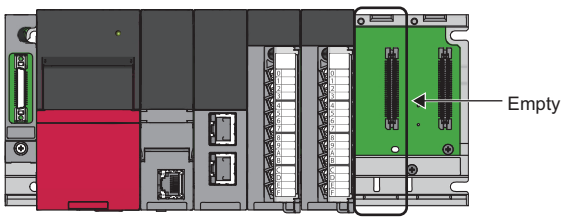
To operate the module that is included in the module configuration of the engineering tool, but without actually mounting the module

- Module configuration



On performing the module status setting, the module becomes a light color, interpreted as an empty slot.

- Mounting state



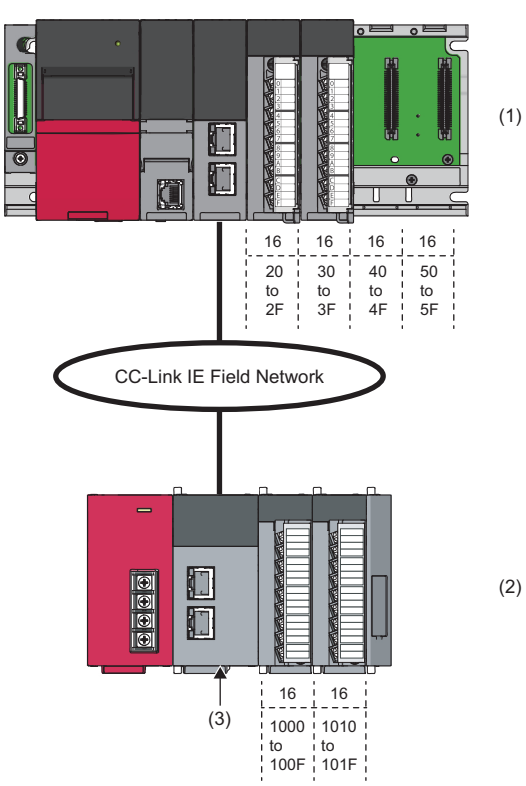
Writing the module configuration to the programmable controllers allows operation even without mounting modules actually.

Assigning I/O numbers in the slave station

Network systems such as CC-Link IE Field Network can be controlled by assigning input "X" and output "Y", which are in the device of the CPU module, to the I/O modules and intelligent function modules in the slave station.

Ex.

Controlling a module mounted on the head module part on CC-Link IE Field Network

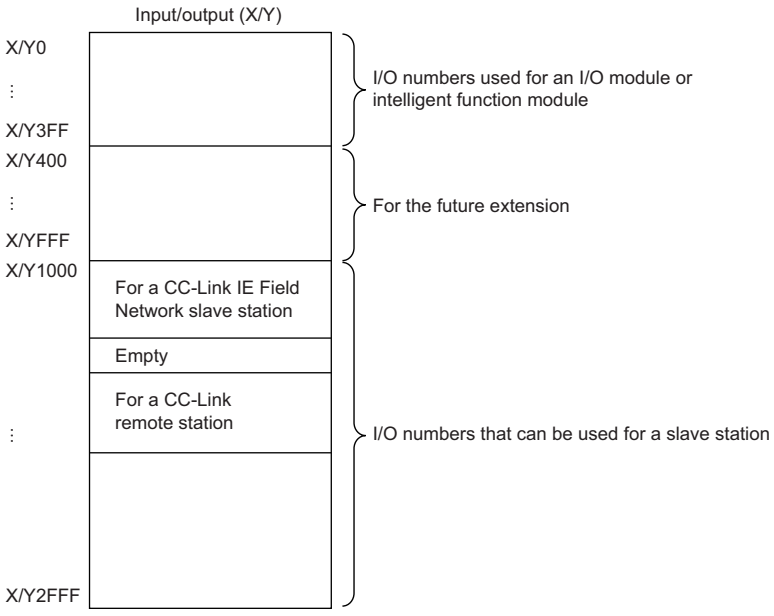


■Available I/O numbers

In the slave station, assign the I/O numbers following the I/O numbers assigned to the modules in the master station.

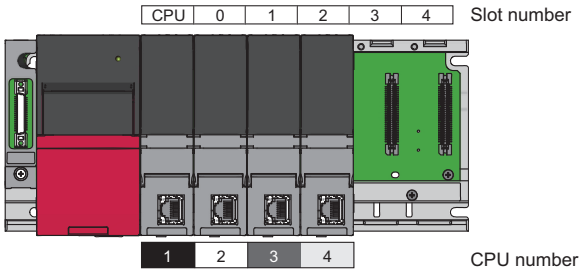
■Precautions

- Avoid duplication of I/O numbers between the refresh destination (device on the CPU module side) on CC-Link IE Field Network and the CC-Link remote station.
- If there is a possibility of adding I/O modules and intelligent function modules to the CPU module side, set the reserved I/O numbers to be added.



2.3 CPU Numbers

CPU numbers refer to the numbers for identifying the CPU modules on the multiple CPU system.
The CPU module mounted on the CPU slot in the base unit is CPU No.1. CPU No.2, CPU No.3, and CPU No.4 are sequentially assigned to the CPU modules on the right side of CPU No.1.



The multiple CPU system configuration requires the specification of mounted CPU modules, so that the I/O numbers are assigned to the CPU modules as well. Assigned I/O numbers are fixed by each CPU number as shown below:

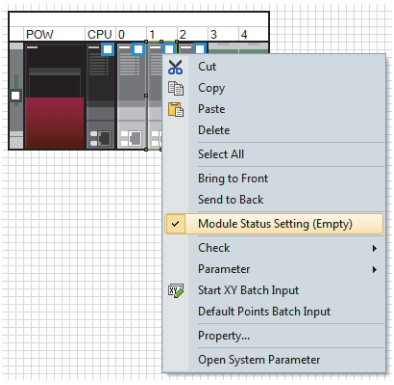
CPU number	Start I/O number of the CPU module
CPU No.1	3E00H
CPU No.2	3E10H
CPU No.3	3E20H
CPU No.4	3E30H

Reservation setting of the CPU module

The reservation setting of the CPU modules excluding CPU No.1 is possible to reserve CPU numbers for the CPU modules to be mounted in the future. (☞ Page 38 Module status setting)
However, if an actually mounted CPU module is set to the disabled status, the module is not to be interpreted as an empty slot.

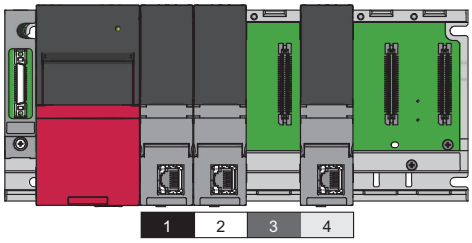
• Module configuration

Perform the module reservation setting on the CPU module at slot number 1.

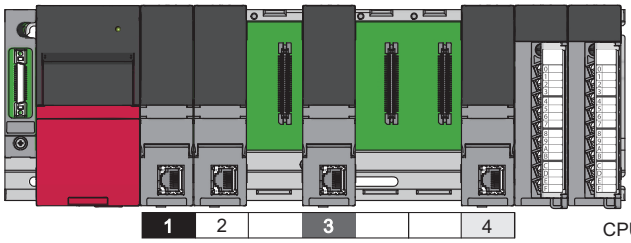


• Mounting state

A reserved CPU number of the CPU module is assigned even without actually mounting the CPU module.

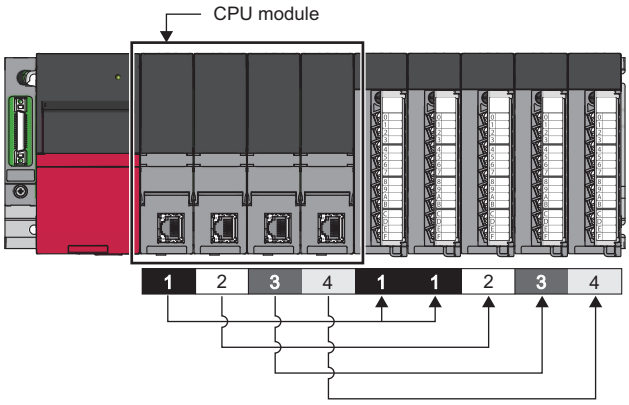


The CPU module can be mounted on the CPU slot and the slot number 0 to 6, where the opening slot between CPU modules can be reserved as an empty slot. I/O modules and intelligent function modules, however, cannot be mounted on the opening slot between CPU modules.

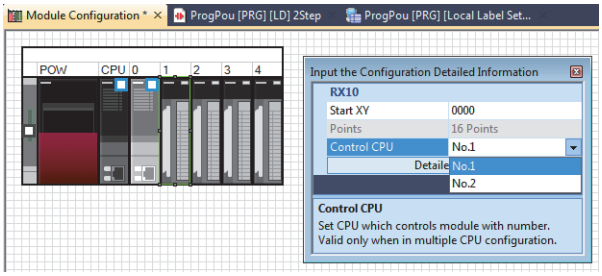


2.4 Control CPU

The control CPU refers to the CPU module that controls I/O modules and intelligent function modules.
The multiple CPU system configuration requires setting of the control CPU that controls modules. If the control CPU is not set, CPU No.1 controls all the modules.



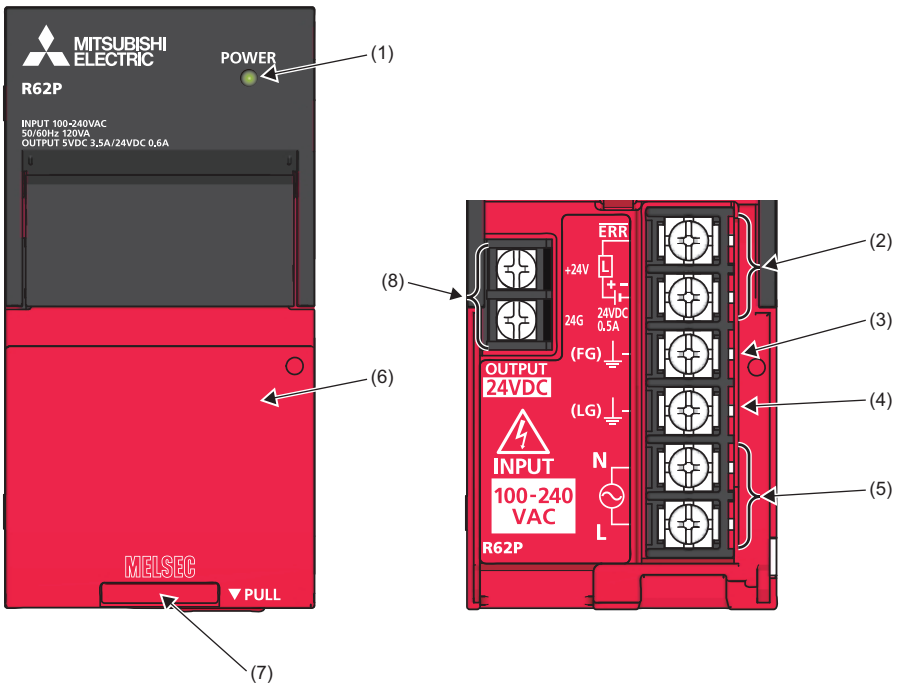
Set the control CPU for each module in "Module Configuration".



3 PART NAMES

3.1 Power Supply Module

This section describes the part names of the power supply module. (The R62P is used as an example.)



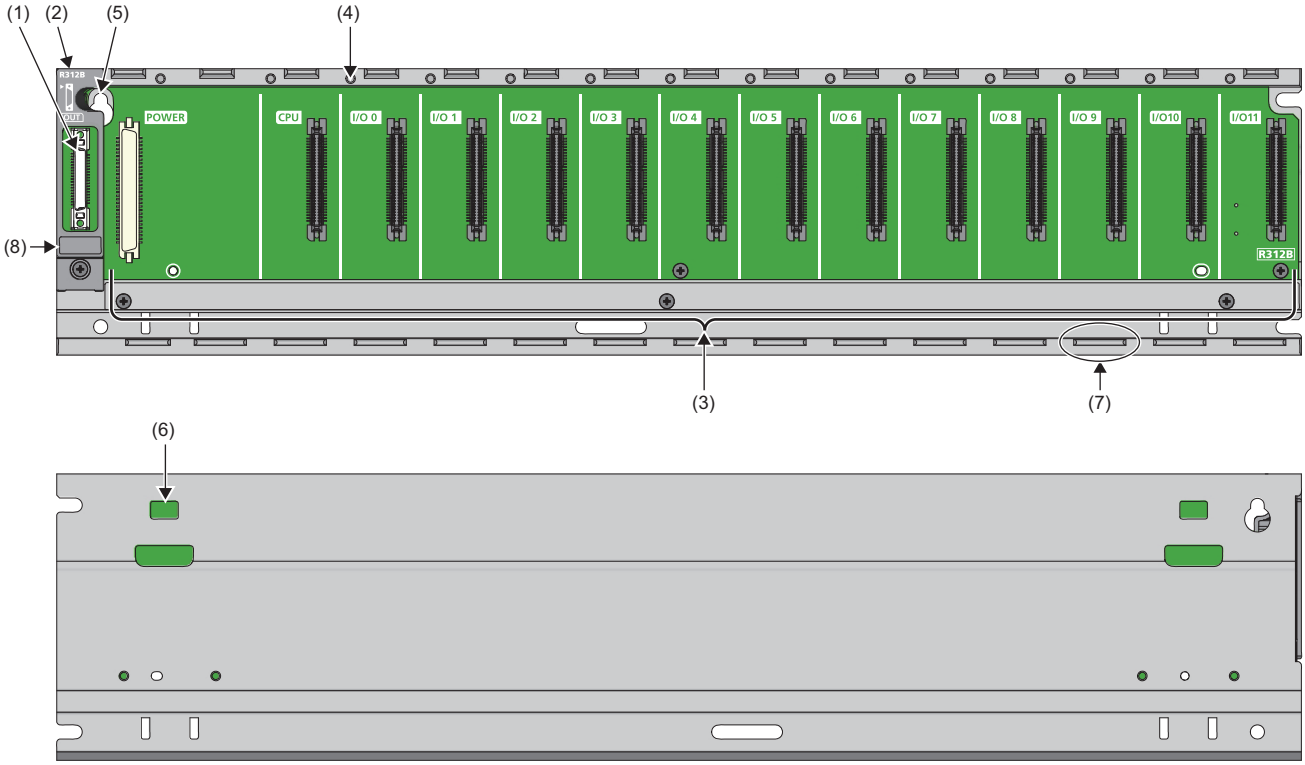
No.	Name	Description
(1)	POWER LED	Indicates the operating status of the power supply module. On: Normal operation Off: Power-off, power failure, or hardware failure (MELSEC iQ-R CPU Module User's Manual (Application))
(2)	$\overline{\text{ERR}}$ contact	Turns on when the entire system operates normally. (M4 screw) This contact turns off (opens) when the power is not supplied, a stop error (including reset) occurs in the CPU module, or the fuse is blown. In a multiple CPU system, the contact turns off when a stop error occurs in any of the CPU modules. The contact is off at all times when the module is mounted on an extension base unit.
(3)	FG terminal*1	A functional ground terminal connected to the shield pattern of the printed circuit board (M4 screw)
(4)	LG terminal*1	A functional ground terminal for the power supply input filter. For AC input, the terminal has one-half the potential of the input voltage. (M4 screw)
(5)	Power input terminal	A power input terminal for the power supply module. The input power supply differs depending on a power supply module. (M4 screw) (☞ Page 49 Performance Specifications of Power Supply Module)
(6)	Terminal cover	A protective cover for the terminal block
(7)	Production information marking	Shows the production information (16 digits) of the module.
(8)*2	+24V and 24G terminals	Used for a device that requires a supply of 24VDC (M3.5 screw). The power is supplied to a device through the external wiring.

*1 Individually ground the FG and LG terminals with a ground resistance of 100 ohms or less.
*2 The R62P only has these terminals.

3.2 Base Unit

Main base unit

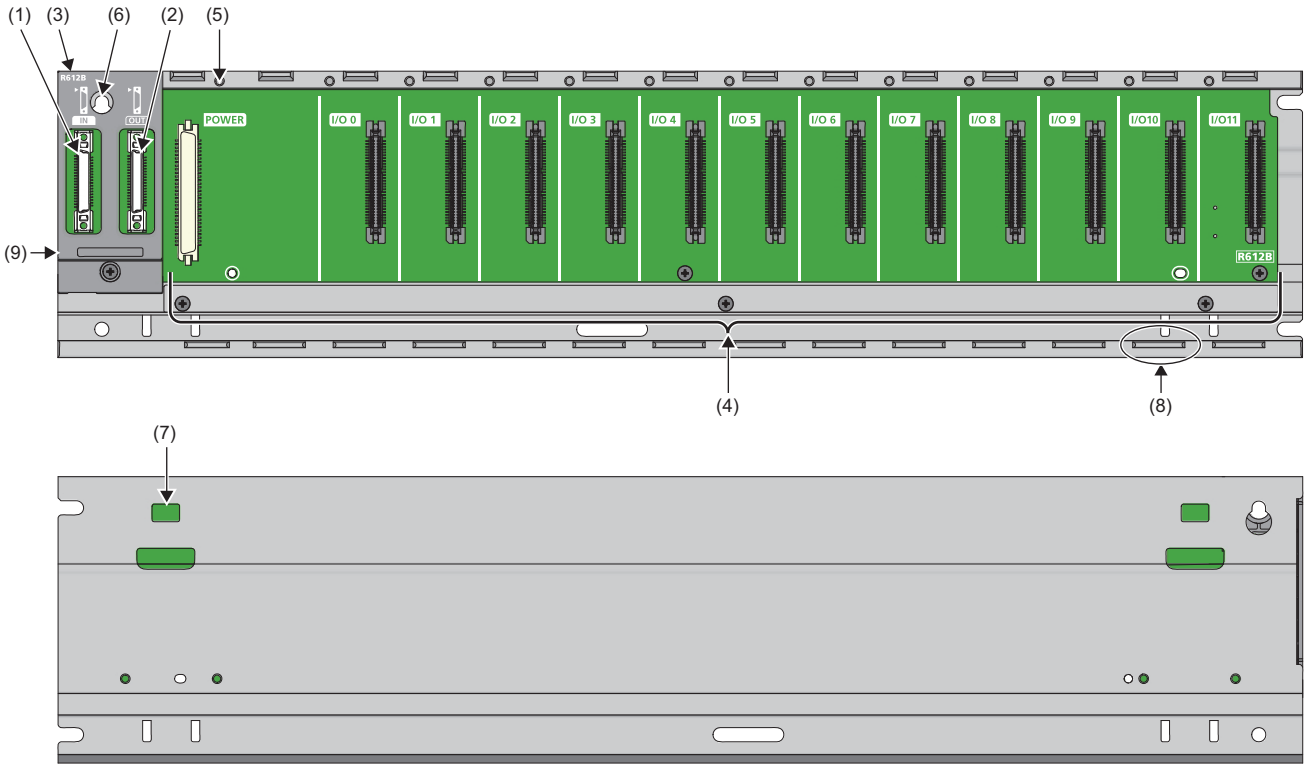
This section describes the part names of the main base unit. (The R312B is used as an example.)



No.	Name	Description
(1)	Extension cable connector (OUT)	A connector for connecting to an extension base unit. A MELSEC iQ-R series extension cable is connected here. When no cable is connected, attach the supplied extension connector cover to prevent entry of foreign matter such as dust.
(2)	Extension connector cover	A protective cover for the extension cable connector
(3)	Module connector	A connector for mounting MELSEC iQ-R series modules. Attach the supplied connector cover or the blank cover module (RG60) to the connector(s) where no module is mounted to prevent entry of foreign matter such as dust.
(4)	Module fixing hole	A screw hole to fix a module to the base unit (M3×12 screw)
(5)	Base unit installation hole	A hole to install the base unit to a control panel (M4 screw)
(6)	DIN rail adapter mounting hole	A hole to mount a DIN rail adapter
(7)	Guide	A guide to mount a module to the base unit
(8)	Production information marking	Shows the production information (16 digits) of the base unit.

Extension base unit

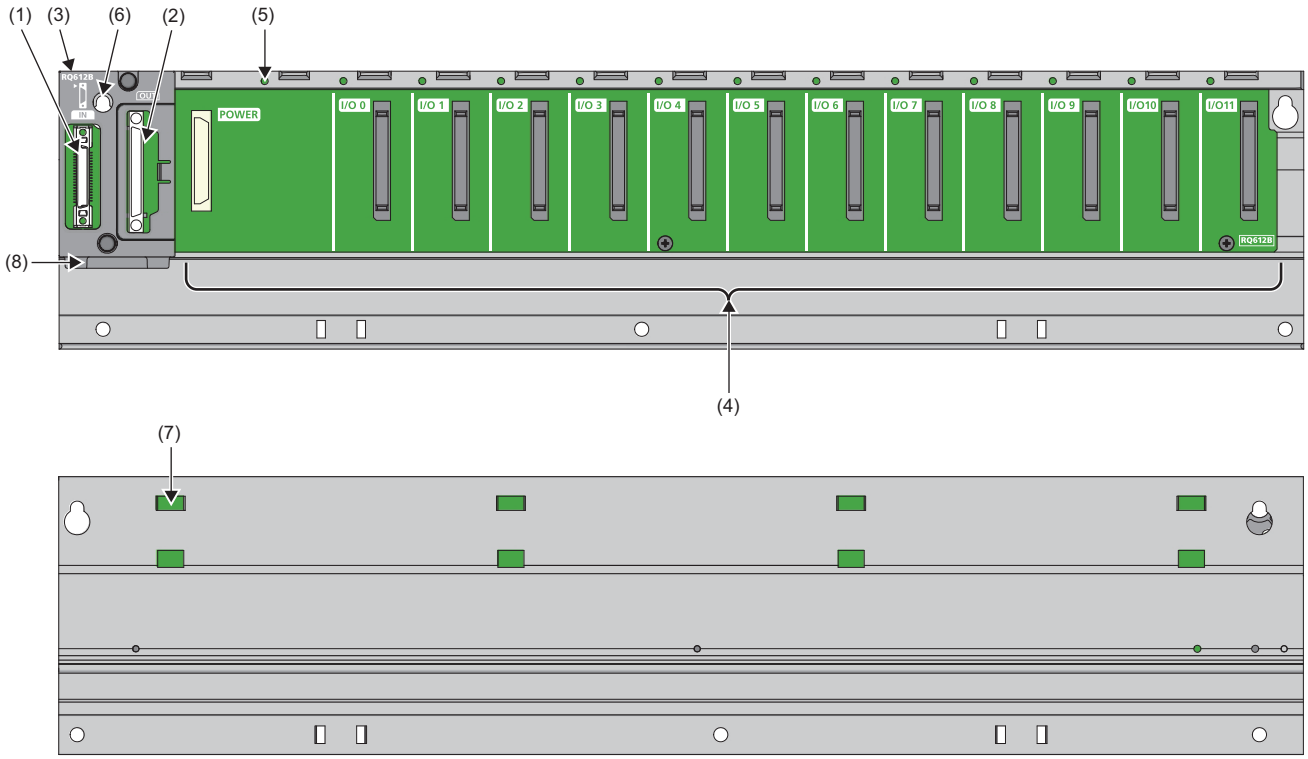
This section describes the part names of the extension base unit. (The R612B is used as an example.)



No.	Name	Description
(1)	Extension cable connector (IN)	A connector for connecting to a base unit (upper level). A MELSEC iQ-R series extension cable is connected here.
(2)	Extension cable connector (OUT)	A connector for connecting to a base unit (lower level). A MELSEC iQ-R series extension cable is connected here. When no cable is connected, attach the supplied extension connector cover to prevent entry of foreign matter such as dust.
(3)	Extension connector cover	A protective cover for the extension cable connector
(4)	Module connector	A connector for mounting MELSEC iQ-R series modules. The CPU module cannot be mounted on an extension base unit. Attach the supplied connector cover or the blank cover module (RG60) to the connector(s) where no module is mounted to prevent entry of foreign matter such as dust.
(5)	Module fixing hole	A screw hole to fix a module to the base unit (M3×12 screw)
(6)	Base unit installation hole	A hole to install the base unit to a control panel (M4 screw)
(7)	DIN rail adapter mounting hole	A hole to mount a DIN rail adapter
(8)	Guide	A guide to mount a module to the base unit
(9)	Production information marking	Shows the production information (16 digits) of the base unit.

RQ extension base unit (for MELSEC-Q series modules)

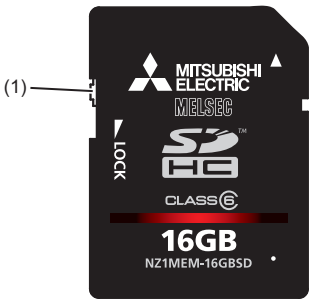
This section describes the part names of the extension base unit. (The RQ612B is used as an example.)



No.	Name	Description
(1)	Extension cable connector (IN)	A connector for connecting to a MELSEC iQ-R series base unit (upper level). A MELSEC iQ-R series extension cable is connected here.
(2)	Extension cable connector (OUT)	A connector for connecting to a MELSEC Q series base unit (lower level). A MELSEC Q series extension cable is connected here. When no cable is connected, attach the supplied extension connector cover to prevent entry of foreign matter such as dust.
(3)	Extension connector cover	A protective cover for the extension cable connector
(4)	Module connector	A connector for mounting MELSEC-Q series modules. The CPU module cannot be mounted on an extension base unit. Attach the supplied connector cover or the blank cover module (QG60) to the connector(s) where no module is mounted to prevent entry of foreign matter such as dust.
(5)	Module fixing hole	A screw hole to fix a module to the base unit (M3×12 screw)
(6)	Base unit installation hole	A hole to install the base unit to a control panel (M4 screw)
(7)	DIN rail adapter mounting hole	A hole to mount a DIN rail adapter
(8)	Production information marking	Shows the production information (16 digits) of the base unit.

3.3 SD Memory Card

This section describes the part names of the SD memory card. (The NZ1MEM-16GBSD is used as an example.)



No.	Name	Description
(1)	Write protect switch	Prevents the data in the card from being erased or modified by setting this switch to the LOCK position.

4 SPECIFICATIONS

4.1 General Specifications

This chapter describes the general specifications of the modules used.

Item	Specifications					
Operating ambient temperature	0 to 55℃					
Storage ambient temperature	-25 to 75℃					
Operating ambient humidity	5 to 95%RH, non-condensing					
Storage ambient humidity	5 to 95%RH, non-condensing					
Vibration resistance	Compliant with JIS B 3502 and IEC 61131-2	—	Frequency	Constant acceleration	Half amplitude	Sweep count
		Under intermittent vibration	5 to 8.4Hz	—	3.5mm	10 times each in X, Y, and Z directions
			8.4 to 150Hz	9.8m/s²	—	
		Under continuous vibration	5 to 8.4Hz	—	1.75mm	—
			8.4 to 150Hz	4.9m/s²	—	
Shock resistance	Compliant with JIS B 3502 and IEC 61131-2 (147m/s², 3 times each in X, Y, and Z bidirections)					
Operating atmosphere	No corrosive gases*4, flammable gases, less conductive dust					
Operating altitude*1	0 to 2000m*5					
Installation location	Inside a control panel					
Overvoltage category*2	Ⅱ or less					
Pollution degree*3	2 or less					
Equipment class	Class 1					

*1 Do not use or store the programmable controller under pressure higher than the atmospheric pressure of altitude 0m. Doing so may cause malfunction. When using the programmable controller under pressure, please consult your local Mitsubishi representative.

*2 This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises. Category Ⅱ applies to equipment for which electrical power is supplied from fixed facilities. The surge voltage withstand level for up to the rated voltage of 300V is 2500V.

*3 This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used. Pollution degree 2 is when only non-conductive pollution occurs. A temporary conductivity caused by condensing must be expected occasionally.

*4 Use the special coated products which comply with the IEC 60721-3-3 3C2 in the environment with the corrosive gases. For details on the special coated products, please consult your local representative.

*5 When the programmable controller is used at altitude above 2000m, the withstand voltage performance and the upper limit of the operating ambient temperature decrease. Please consult your local Mitsubishi representative.

4.2 Performance Specifications of Power Supply Module

This section describes the performance specifications of the power supply module.

Item		AC input power supply module			DC input power supply module
		R61P	R62P	R64P	R63P
Input power supply voltage		100 to 240VAC (85 to 264VAC)			24VDC (15.6 to 31.2VDC)
Input frequency		50/60Hz±5%			—
Input voltage distortion factor		Within 5%			—
Maximum input apparent power		130VA	120VA	160VA	—
Maximum input power		—			50W
Inrush current		20A, 8ms or less			100A, 1ms or less
Rated output current	5VDC	6.5A	3.5A	9A	6.5A
	24VDC	—	0.6A	—	—
Overcurrent protection	5VDC	7.1A or higher	3.8A or higher	10.0A or higher	7.1A or higher
	24VDC	—	0.66A or higher	—	—
Overvoltage protection	5VDC	5.5 to 6.5V			
Efficiency		76% or more			70% or more
Allowable momentary power failure time		Within 20ms			Within 10ms
Withstand voltage		2300VACrms per minute (altitude 0 to 2000m), between all input & LG terminals and all output & FG terminals			510VAC per minute (altitude 0 to 2000m), between primary terminal and 5VDC terminal
Insulation resistance		10MΩ or higher between all input & LG terminals and all output & FG terminals, between all input terminals and LG terminal, between all output terminals and FG terminal (500VDC insulation resistance tester)			
Noise immunity		• Noise voltage 1500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (noise simulator condition) • Noise immunity test IEC 61000-4-4: 2kV			
Fuse		Built-in (user-unchangeable)			
Contact output section	Application	$\overline{\text{ERR}}$ contact			
	Rated switching voltage/current	24VDC, 0.5A			
	Minimum switching load	5VDC, 1mA			
	Response time	Off→on: 10ms or less On→off: 12ms or less			
	Life	Mechanical: 20 million times or more Electrical: Rated switching voltage/current, 100 thousand times or more			
	Surge suppressor	None			
	Fuse	None			
Terminal screw size		M4 (M3.5 for +24V and 24G terminals of the R62P)			
Applicable wire size		0.75 to 2mm²			
Applicable solderless terminal		RAV1.25-4, RAV2-4, thickness of 0.8mm or less, up to two solderless terminal connections per terminal (for the +24V and 24G terminals of the R62P: RAV1.25-3.5, RAV2-3.5, thickness of 0.8mm or less, up to two solderless terminal connections per terminal)			
Applicable tightening torque		M4 screw: 1.02 to 1.38N·m M3.5 screw: 0.66 to 0.89N·m			
External dimensions	Height	106mm (Base unit mounting side: 98mm)			
	Width	54.6mm			
	Depth	110mm			
Weight		0.41kg	0.45kg	0.46kg	0.41kg

Detailed explanation of items

■Input power supply voltage

Input power supply voltage is a voltage required for the power supply module to operate normally. If the voltage is out of the specified range, an error is detected and the system may stop.

■Inrush current

Inrush current is the maximum, instantaneous input current drawn into the circuits immediately after power-on.
If power is supplied to the system immediately after shut-off, an inrush current of more than the specified value may flow.
Wait for five seconds or more after shut-off, and supply power to the system again.
When selecting a fuse or breaker for the external circuit, consider blowouts, sensing property, and specified value of inrush current.

■Overcurrent protection

The function of this protection is to shut off the circuit to stop the system if a current exceeding the specification value flows into a 5VDC or 24VDC circuit.
With overcurrent protection activated, the LED of the power supply module turns off or lights dim green due to a voltage drop.
To restart the system, shut off the power and eliminate the cause of the problem, such as insufficient current or short-circuit.
After the cause is eliminated, wait for a few minutes, and supply power to the system again. When the output current is back to normal, the system starts initially.

■Overvoltage protection

The function of this protection is to shut off the circuit to stop the system if an overvoltage exceeding the specified value is applied to a 5VDC circuit.
With overvoltage protection activated, the POWER LED of the power supply module turns off.
To restart the system, shut off the power, wait for a few minutes, and supply power to the system again. Then, the system starts initially.
If the system does not restart and the POWER LED remains off, replace the power supply module.

■Allowable momentary power failure time

The system detects an input voltage down and stops its operation when a momentary power failure occurs. Allowable momentary power failure time is a period of time that the system can continue its operation even after the power failure.
If power fails exceeding this period of time, the system can either continue its operation or start initially, depending on the load of the power supply module. When the system continues its operation, the operation will be the same as that of the system returned within the allowable momentary power failure time.

Selecting the power supply module

The power supply module should be selected in accordance with the total current consumption of the power supply target base unit, CPU module(s), I/O module(s), and intelligent function module(s).

Select the power supply module so that the current consumption of the base unit does not exceed the rated output current of the power supply module mounted on the base unit.

For the internal current consumption (5VDC) of the base unit and CPU module, refer to the following.

- Base unit (☞ Page 52 Performance Specifications of Base Unit)
- CPU module (📖 MELSEC iQ-R CPU Module User's Manual (Startup))

For the internal current consumption (5VDC) of each module, refer to the manual for the module used.

For devices obtained by a user, such as an external power supply (24VDC) and breaker, refer to the manual for the device used.

■When MELSEC-Q series modules are connected

Select the power supply module so that the current consumption of each extension base unit does not exceed the rated output current of the power supply module mounted on each extension base unit.

When the extension base unit (type requiring no power supply module) (Q5□B) is used, power is supplied from the power supply module mounted on the RQ extension base unit. Select the power supply module so that the total current consumption of the modules on the RQ extension base unit and the Q5□B does not exceed the rated output current of the power supply module mounted on the RQ extension base unit. (☞ Page 27 Consideration for internal current consumption)

Point

The current consumption can be checked using the engineering tool (Power Supply Capacity and I/O Points).

4.3 Performance Specifications of Base Unit

This section describes the performance specifications of the base unit.

Main base unit

Item		R35B	R38B	R312B
Number of mountable I/O modules		5	8	12
DIN rail adapter model		R6DIN1		
Internal current consumption (5VDC)		0.58A	0.71A	0.88A
Mounting hole size		M4 screw hole or Φ4.5 hole (for M4 screw)		
External dimensions	Height	101mm		
	Width	245mm	328mm	439mm
	Depth	32.5mm		
Weight		0.41kg	0.55kg	0.72kg

Extension base unit

Item		R65B	R68B	R612B
Number of mountable I/O modules		5	8	12
DIN rail adapter model		R6DIN1		
Internal current consumption (5VDC)		0.70A	0.81A	0.92A
Mounting hole size		M4 screw hole or Φ4.5 hole (for M4 screw)		
External dimensions	Height	101mm		
	Width	245mm	328mm	439mm
	Depth	32.5mm		
Weight		0.41kg	0.55kg	0.73kg

Extension cable

Item	RC06B	RC12B	RC30B	RC50B
Length	0.6m	1.2m	3.0m	5.0m
Weight	0.15kg	0.21kg	0.40kg	0.60kg

RQ extension base unit (for MELSEC-Q series modules)

Item		RQ65B	RQ68B	RQ612B
Number of mountable I/O modules		5	8	12
DIN rail adapter model		Q6DIN2	Q6DIN1	
Internal current consumption (5VDC)		0.28A	0.31A	0.32A
Mounting hole size		M4 screw hole or Φ4.5 hole (for M4 screw)		
External dimensions	Height	98mm		
	Width	245mm	328mm	439mm
	Depth	44.1mm		
Weight		0.32kg	0.41kg	0.55kg

For the specifications of MELSEC-Q series extension cables, refer to the following.

QCPU User's Manual (Hardware Design, Maintenance and Inspection)

4.4 Performance Specifications of SD Memory Card

This section describes the performance specifications of the SD memory card.

Item		NZ1MEM-2GBSD	NZ1MEM-4GBSD	NZ1MEM-8GBSD	NZ1MEM-16GBSD
Type		SD	SDHC		
Capacity		2G bytes	4G bytes	8G bytes	16G bytes
Number of writings		60000 times	100000 times		
External dimensions	Height	32mm			
	Width	24mm			
	Depth	2.1mm			
Weight		2g			

For details on the performance specifications of the L1MEM-2GBSD and L1MEM-4GBSD, refer to the following.
QCPU User's Manual (Hardware Design, Maintenance and Inspection)

Handling precautions

- The operation of the SD memory cards manufactured by Mitsubishi (NZ1MEM-□GBSD) has been tested on the MELSEC iQ-R series modules. An SD memory card manufactured by others*1 may cause corruption of data in the SD memory card, a shutdown of the system, or other malfunctions.
- When inserted into a compatible module, the SD memory card manufactured by Mitsubishi already conforms to IEC 61131-2.
- An SD memory card of the card type SDHC can be used only with products that bear the SDHC logo on the surface or in the user's manual. Be aware that this type of card cannot be used with products that support only the card type SD.
- All SD memory cards to be used in the CPU module need to be formatted. When purchased, an SD memory card is unformatted; thus, before use, insert the SD memory card into the CPU module to format it using the engineering tool. Do not attempt to format an SD memory card on a personal computer. (GX Works3 Operating Manual)
- While access to an SD memory card is in progress, performing a power-off or reset, or ejecting the SD memory card may cause corruption of data in the SD memory card. If the CARD ACCESS LED is on, be sure to deactivate the access to the SD memory card with the SD memory card access control switch, and then perform a power-off or reset, or eject the SD memory card. The use of the SD memory card can be disabled by SM606 (SD memory card forced disable instruction) and the disabled status can be checked by SM607 (SD memory card forced disable status flag).
- The recommended way to protect precious data is to make a backup regularly on other media such as CDs and DVDs.

*1 For the SD memory cards that are commercially available and connectable, refer to the following. Before use, properly verify that the control performance on the system is free from a problem.
TECHNICAL BULLETIN No.FA-A-0078

Precautions

If the CPU module is powered off or reset, or the SD memory card is removed while the card is being accessed as below, data on the SD memory card may corrupt.

- During saving data in the buffer memory to an SD memory card by using the data logging function
- During the folder delete by "User Data Operation" in the engineering tool

In the above case, the SD memory card diagnostics such as the file system check and restoration) is performed at powering off the system or the reset clear.
Note that the data may be not restored because of the file system status.
Diagnosing the SD memory card takes the following times (assuming that 10000 files (100K bytes) are stored in the SD memory card).*1*2

- NZ1MEM-2GBSD: approximately 7 seconds NZ1MEM-4GBSD: approximately 8 seconds NZ1MEM-8GBSD: approximately 9 seconds NZ1MEM-16GBSD: approximately 10 seconds

*1 The more the number of files in the SD memory card, the longer the diagnosis time.
*2 When the CPU module is in connection with an external device, running the CPU module and the external device simultaneously can cause communication time-out on the external devise side.

4.5 Performance Specifications of Battery

This section describes the performance specifications of the battery used for the CPU module.

Item	Q6BAT	Q7BAT*1
Type	Manganese dioxide lithium primary battery	
Initial voltage	3.0V	
Nominal current	1800mAh	5000mAh
Battery life when not used	Approximately 5 years (room temperature)	
Lithium content	0.52g	1.55g
Application	To hold backup data and clock data	

*1 The Q7BAT-SET includes a battery holder.

Battery life

For the programmable controller CPU

There are two types of values for describing a battery life: actual service value and guaranteed value.

■Actual service value (reference value)

The actual service value (reference value) refers to the battery life estimated based on our actual measurement value under a storage ambient temperature of 40℃. This value is intended for reference only because it varies depending on the characteristics of the components.

- Actual service value of the Q6BAT and Q7BAT: 43800 hours (5.00 years)

■Guaranteed value

The guaranteed value refers to the battery life at 70℃ where we can give a guarantee, the value of which is estimated based on the characteristics of the memory device, provided by the components manufacturer, under a storage ambient temperature of -25 to 75℃ (an operating ambient temperature of 0 to 55℃).

Here are the guaranteed values of the Q6BAT and Q7BAT.

Whether to use an extended SRAM cassette	Power-on time ratio*1	Guaranteed value with the R04CPU used		Guaranteed value with the R08CPU, R16CPU, R32CPU, or R120CPU used	
		Q6BAT	Q7BAT	Q6BAT	Q7BAT
Not used	0%	31700 hours (3.61 years)	43800 hours (5.00 years)	30600 hours (3.49 years)	43800 hours (5.00 years)
	30%	43800 hours (5.00 years)		43700 hours (4.98 years)	
	50 to 100%			43800 hours (5.00 years)	
Used (1MB type)	0%	22000 hours (2.51 years)		21500 hours (2.45 years)	
	30%	31400 hours (3.58 years)		30700 hours (3.50 years)	
	50%	43800 hours (5.00 years)		43000 hours (4.90 years)	
	70 to 100%			43800 hours (5.00 years)	
Used (2MB type)	0%	19600 hours (2.23 years)		19100 hours (2.18 years)	43100 hours (4.92 years)
	30%	28000 hours (3.19 years)		27200 hours (3.10 years)	43800 hours (5.00 years)
	50%	39200 hours (4.47 years)		38200 hours (4.36 years)	
	70 to 100%	43800 hours (5.00 years)		43800 hours (5.00 years)	

Whether to use an extended SRAM cassette	Power-on time ratio*1	Guaranteed value with the R04CPU used		Guaranteed value with the R08CPU, R16CPU, R32CPU, or R120CPU used	
		Q6BAT	Q7BAT	Q6BAT	Q7BAT
Used (4MB type)	0%	15300 hours (1.74 years)	39600 hours (4.52 years)	15000 hours (1.71 years)	36200 hours (4.13 years)
	30%	21800 hours (2.48 years)	43800 hours (5.00 years)	21400 hours (2.44 years)	43800 hours (5.00 years)
	50%	30600 hours (3.49 years)		30000 hours (3.42 years)	
	70 to 100%	43800 hours (5.00 years)		43800 hours (5.00 years)	
Used (8MB type)	0%	10100 hours (1.15 years)	26900 hours (3.07 years)	10000 hours (1.14 years)	24800 hours (2.83 years)
	30%	14400 hours (1.64 years)	38400 hours (4.38 years)	14200 hours (1.62 years)	35400 hours (4.04 years)
	50%	20200 hours (2.30 years)	43800 hours (5.00 years)	20000 hours (2.28 years)	43800 hours (5.00 years)
	70%	33600 hours (3.83 years)		33300 hours (3.80 years)	
	100%	43800 hours (5.00 years)		43800 hours (5.00 years)	

*1 The power-on time ratio indicates the ratio of the programmable controller power-on time to 24 hours. (If the total power-on time is 12 hours, the ratio will be 50%. If the total power-on time is 6 hours, the ratio will be 25%.)

For the Process CPU

There are two types of values for describing a battery life: actual service value and guaranteed value.

■Actual service value (reference value)

The actual service value (reference value) refers to the battery life estimated based on our actual measurement value under a storage ambient temperature of 40℃. This value varies depending on the characteristics and variation of the components, and should be referred to as a reference value.

Whether to use an extended SRAM cassette	Power-on time ratio[*1]	Actual service value with the R08PCPU or R16PCPU used		Actual service value with the R32PCPU or R120PCPU used	
		Q6BAT	Q7BAT	Q6BAT	Q7BAT
Not used, Used (1MB type), Used (2MB type)	0 to 100%	43800 hours (5.00 years)	43800 hours (5.00 years)	43800 hours (5.00 years)	43800 hours (5.00 years)
Used (4MB type)	0%			42200 hours (4.81 years)	
	30 to 100%			43800 hours (5.00 years)	
Used (8MB type)	0%	33700 hours (3.84 years)		31700 hours (3.61 years)	
	30 to 100%	43800 hours (5.00 years)		43800 hours (5.00 years)	
Used (ECC-capable 8MB type)	0%	24000 hours (2.73 years)		23000 hours (2.62 years)	
	30%	34200 hours (3.90 years)		32800 hours (3.74 years)	
	50 to 100%	43800 hours (5.00 years)		43800 hours (5.00 years)	

■Guaranteed value

The guaranteed value refers to the battery life at 70℃ where we can give a guarantee, the value of which is estimated based on the characteristics of the memory device, provided by the components manufacturer, under a storage ambient temperature of -25 to 75℃ (an operating ambient temperature of 0 to 55℃).

Here are the guaranteed values of the Q6BAT and Q7BAT.

Whether to use an extended SRAM cassette	Power-on time ratio[*1]	Guaranteed value with the R08PCPU or R16PCPU used		Guaranteed value with the R32PCPU or R120PCPU used	
		Q6BAT	Q7BAT	Q6BAT	Q7BAT
Not used	0%	24400 hours (2.78 years)	43800 hours (5.00 years)	17300 hours (1.97 years)	39900 hours (4.55 years)
	30%	34800 hours (3.97 years)		24700 hours (2.81 years)	43800 hours (5.00 years)
	50%	43800 hours (5.00 years)		34600 hours (3.94 years)	
	70 to 100%			43800 hours (5.00 years)	
Used (1MB type)	0%	18100 hours (2.06 years)	41500 hours (4.73 years)	13900 hours (1.58 years)	34200 hours (3.900 years)
	30%	25800 hours (2.94 years)	43800 hours (5.00 years)	19800 hours (2.26 years)	43800 hours (5.00 years)
	50%	36200 hours (4.13 years)		27800 hours (3.17 years)	
	70 to 100%	43800 hours (5.00 years)		43800 hours (5.00 years)	

Whether to use an extended SRAM cassette	Power-on time ratio*1	Guaranteed value with the R08PCPU or R16PCPU used		Guaranteed value with the R32PCPU or R120PCPU used	
		Q6BAT	Q7BAT	Q6BAT	Q7BAT
Used (2MB type)	0%	16400 hours (1.87 years)	38500 hours (4.39 years)	12900 hours (1.47 years)	32000 hours (3.65 years)
	30%	23400 hours (2.67 years)	43800 hours (5.00 years)	18400 hours (2.10 years)	43800 hours (5.00 years)
	50%	32800 hours (3.74 years)		15800 hours (2.94 years)	
	70%	43800 hours (5.00 years)		43000 hours (4.90 years)	
	100%			43800 hours (5.00 years)	
Used (4MB type)	0%	13300 hours (1.51 years)	33300 hours (3.80 years)	10900 hours (1.24 years)	27000 hours (3.08 years)
	30%	19000 hours (2.16 years)	43800 hours (5.00 years)	15500 hours (1.76 years)	38500 hours (4.39 years)
	50%	26600 hours (3.03 years)		21800 hours (2.48 years)	43800 hours (5.00 years)
	70%	43800 hours (5.00 years)		36300 hours (4.14 years)	
	100%			43800 hours (5.00 years)	
Used (8MB type)	0%	9200 hours (1.05 years)	22900 hours (2.61 years)	8000 hours (0.91 years)	19800 hours (2.26 years)
	30%	13100 hours (1.49 years)	32700 hours (3.73 years)	11400 hours (1.30 years)	28200 hours (3.21 years)
	50%	18400 hours (2.10 years)	43800 hours (5.00 years)	16000 hours (1.82 years)	39600 hours (4.52 years)
	70%	30600 hours (3.49 years)		26600 hours (3.03 years)	43800 hours (5.00 years)
	100%	43800 hours (5.00 years)		43800 hours (5.00 years)	
Used (ECC-capable 8MB type)	0%	6100 hours (0.69 years)	15100 hours (1.72 years)	5500 hours (0.62 years)	13700 hours (1.56 years)
	30%	8700 hours (0.99 years)	21500 hours (2.45 years)	7800 hours (0.89 years)	19500 hours (2.22 years)
	50%	12200 hours (1.39 years)	30200 hours (3.44 years)	11000 hours (1.25 years)	27400 hours (3.12 years)
	70%	20300 hours (2.31 years)	43800 hours (5.00 years)	18300 hours (2.08 years)	43800 hours (5.00 years)
	100%	43800 hours (5.00 years)		43800 hours (5.00 years)	

*1 The power-on time ratio indicates the ratio of the programmable controller power-on time to 24 hours. (If the total power-on time is 12 hours, the ratio will be 50%. If the total power-on time is 6 hours, the ratio will be 25%.)

Precautions

Note the following precautions regarding battery life.

- Use the battery within the guaranteed period of life time. If the battery is used exceeding the guaranteed period, back up the data on the device/label memory.
- When SM52 (Battery low) turns on, replace the battery immediately. (☞ Page 97 Battery replacement procedure)

5 INSTALLATION AND WIRING

5.1 Installation Environment

Install a programmable controller according to the installation environment shown in the general specifications. (☞ Page 48 General Specifications)

Do not install the programmable controller to the following place.

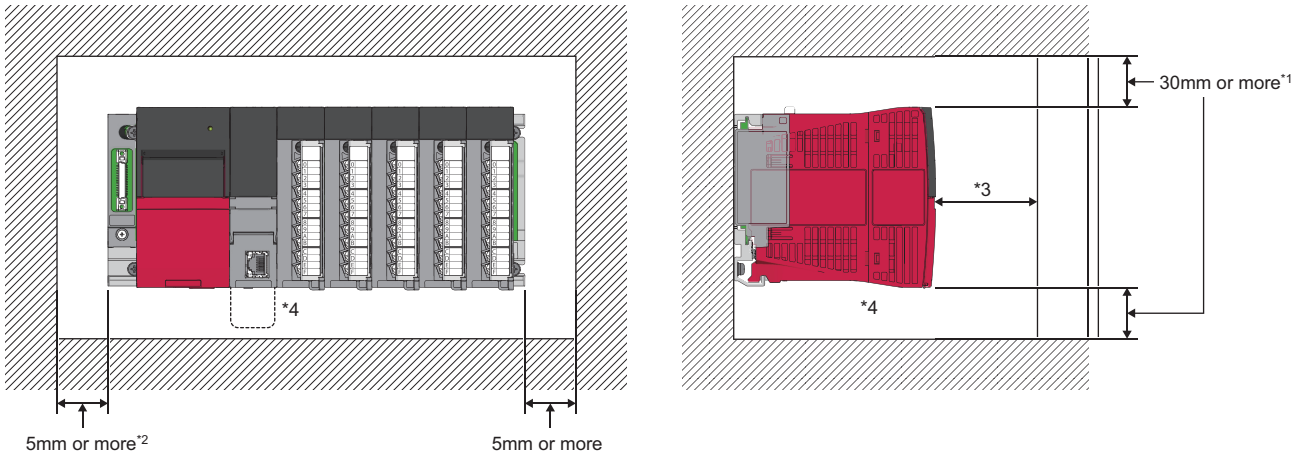
- Ambient temperature is outside the range of 0 to 55℃.
- Ambient humidity is outside the range of 5 to 95%RH.
- Condensation occurs because of rapid temperature change.
- Corrosive gas or combustible gas exists.
- Conductive powder such as dust and iron powder, oil mist, salinity, or organic solvent is filled.
- Programmable controller is exposed to direct sunlight.
- Strong electric field or strong magnetic field is generated.
- Programmable controller is subject to vibration and shock.

5.2 Installation Position

When installing a programmable controller in a control panel, fully consider its operability, maintainability, and environmental resistance.

Installation position for programmable controller

To improve the airflow and change a module easily, provide clearance between the module top/bottom and structures/parts as shown below.



A shaded area shows the ceiling of a control panel, wiring duct, or parts.

*1 Provide clearance of 30mm or more when the height of a wiring duct is 50mm or less. In other cases, provide clearance of 40mm or more.

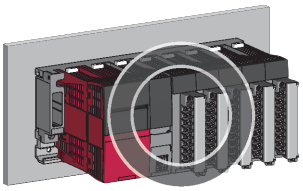
*2 Provide clearance of 20mm or more when an extension cable is connected/removed without removing a power supply module.

*3 Provide clearance of 20mm or more for a power supply module, and 80mm or more for a module using a connector for external devices.

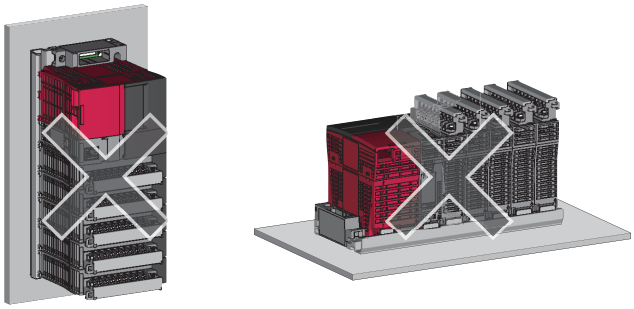
*4 Provide clearance of 45mm or more when the Q7BAT is installed.

Installation direction for programmable controller

- To improve the airflow for heat dispassion, install a programmable controller in the following direction.



- Do not install the programmable controller in the following direction.



Installation surface

Install a base unit on a flat surface.

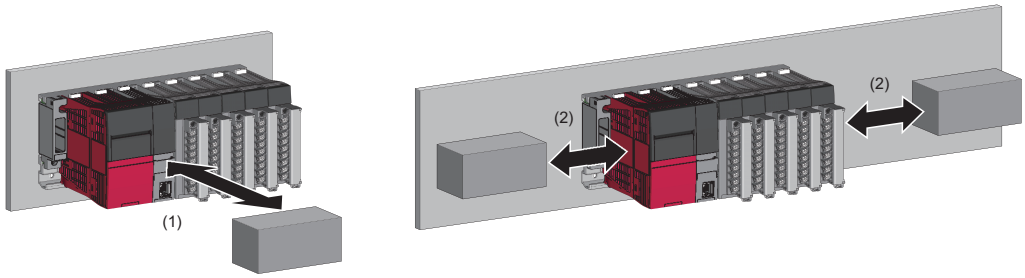
If the installation surface is uneven, excessive force is applied to the printed-circuit board, which may cause malfunction.

Installation of programmable controller with other devices

To avoid the close installation of a programmable controller and vibration sources such as an electromagnetic contactor and no fuse breaker, install them in a different control panel or at a distance.

Clearance between a programmable controller and other devices

Provide the following clearance between the programmable controller and other devices such as a contactor and relay to avoid influence from the radiated noise and heat.



(1) A device in front of a programmable controller: 100mm or more

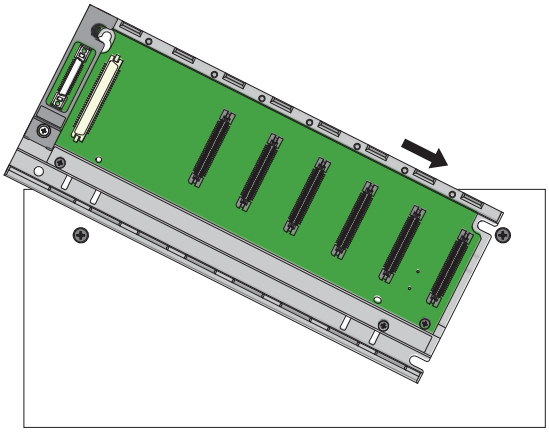
(2) A device on the right and left of a programmable controller: 50mm or more

5.3 Installing Base Unit to Control Panel

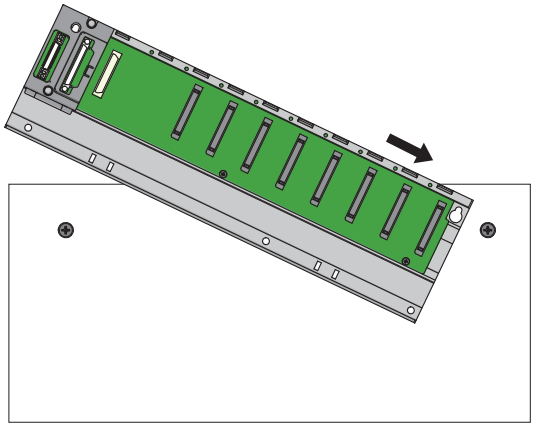
This section describes the installation method for a base unit to a control panel.

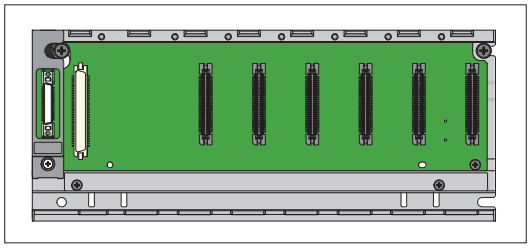
Installation method

Main base unit, extension base unit



RQ extension base unit





1. Fix two mounting screws for the upper side of the base unit to the control panel.

2. Place the notch on the right side of the base unit to a screw on the right side of the control panel.

When the RQ extension base unit is used, place the bell-shaped hole on the right side of the base unit to the screw on the right side of the control panel.

3. Place the bell-shaped hole on the left side of the base unit to a screw on the left side of the control panel.

4. Fix the mounting screws into the holes at the bottom of the base unit, and retighten all the mounting screws.

Point

When the base unit mounted modules is installed on the control panel, install the base unit, without a module on the right end slot, on the control panel. The removal method is the same.
Installing the main base unit, without the power supply module on the left end slot, on the control panel is recommended. The mounting screws can be tightened by inserting a screwdriver acock. The removal method is the same.

5.4 Mounting Base Unit on the DIN Rail

Mounting the base unit on the DIN rail

This section describes the installation method for a base unit to a DIN rail.

A DIN rail adapter (sold separately) is required to install the base unit to the DIN rail.

For the MELSEC-Q series extension base unit, refer to the following.

QCPU User's Manual (Hardware Design, Maintenance and Inspection)

Applicable DIN rail adapter model

■Main base unit, extension base unit

- For R3□B, R6□B: R6DIN1

Model	Pieces				
	Hook A	Hook B-C (with two mounting screws)	Stopper	Square washer	Mounting screw (M5×10)
R6DIN1	2	2	2	3	3

■RQ extension base unit

Use the MELSEC-Q series DIN rail adapter for the RQ extension base unit.

- For RQ68B, RQ612B: Q6DIN1
- For RQ65B: Q6DIN2

Model	Pieces				
	Adapter (larger)	Adapter (smaller)	Stopper	Square washer	Mounting screw (M5×10)
Q6DIN1	2	4	2	3	3
Q6DIN2	2	3	2	2	2

Applicable DIN rail model (IEC 60715)

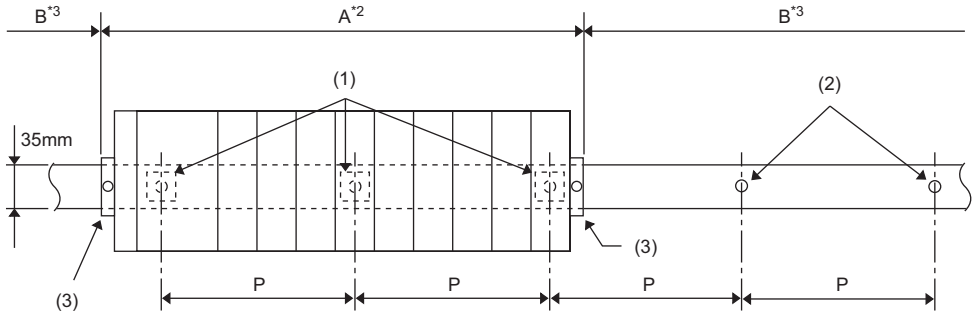
- TH35-7.5Fe
- TH35-7.5Al
- TH35-15Fe

Interval between DIN rail mounting screws

When a DIN rail is used, tighten DIN rail mounting screws in interval of 200mm or less to ensure the sufficient strength of the rail.

Tighten the DIN rail by using the mounting screws and square washers included with the DIN rail adapter. When the TH35-15Fe is used, the square washers are not required.

- When the base unit which has eight slots or more is used, screw three spots as below.



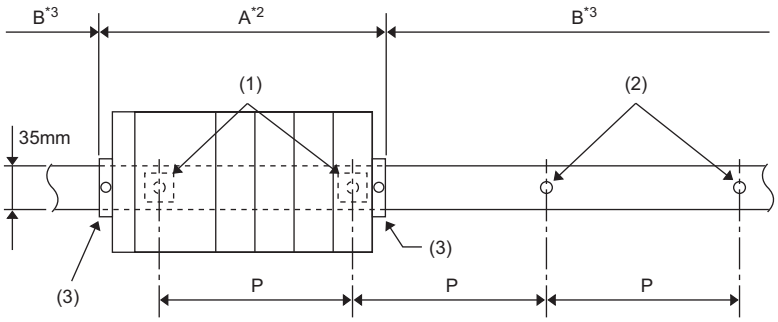
P = 200mm or less

(1) Mounting screws (included with the DIN rail adapter)*1

(2) Mounting screws (sold separately)

(3) Stoppers

- When the base unit which has five slots or less is used, screw two spots as below.



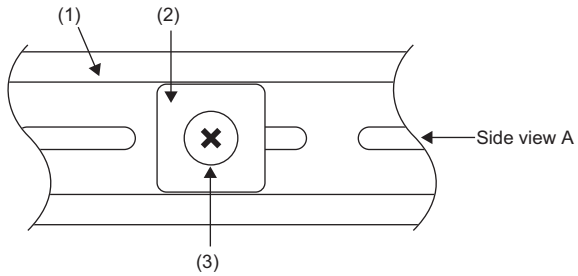
P = 200mm or less

(1) Mounting screws (included with the DIN rail adapter)*1

(2) Mounting screws (sold separately)

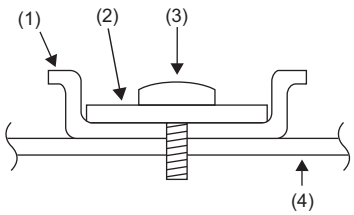
(3) Stoppers

*1 The following shows the installation position of the square washer.



(1) DIN rail
(2) Square washer
(3) Mounting screw (M5×10)
(4) Mounting side such as a control panel

• A arrow view

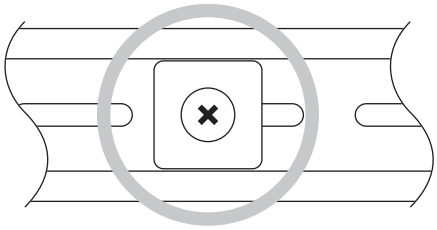


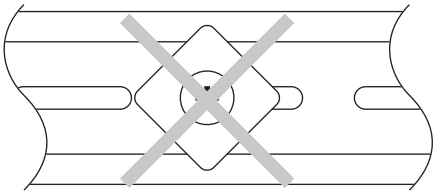
*2 For the A position, tighten the DIN rail on the control panel by using the mounting screws and square washers included with the DIN rail adapter.

*3 For the B position where the base unit is not mounted, the mounting screws and square washers included with the DIN rail adapter are not required. Tighten the DIN rail with the mounting screws (sold separately).

■Precautions

- Use the DIN rail which M5 size screws can be used.
- Use only one square washer for each mounting screw. Use only the square washers included with the DIN rail adapter. If two or more square washers are used together for one mounting screw, the screw may interfere with the base unit.
- Align the square washer parallel to the DIN rail.



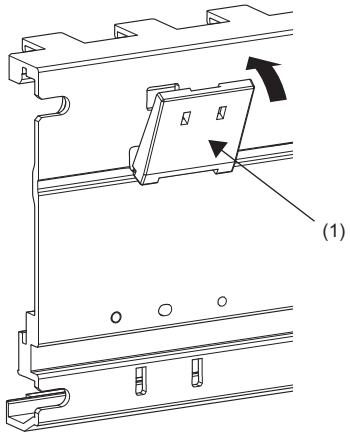


Installing the DIN rail adapter

When the base unit is mounted on the DIN rail, install the DIN rail adapter on the base unit.

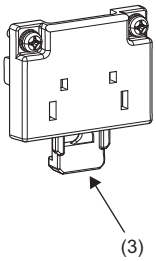
■Main base unit, extension base unit

Use the hook As, hook B-Cs, and stoppers included with the MELSEC iQ-R series DIN rail adapter for the main base unit and extension base unit.

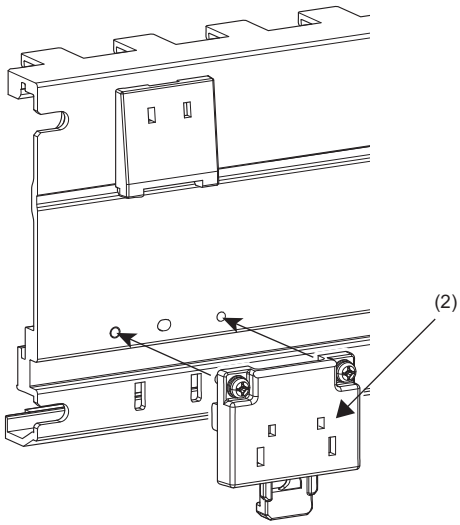


1. Insert the hook A (1) to the lower square hole of two square holes at the upper part of the base unit and push the upper part of the hook until it clicks. (two spots)

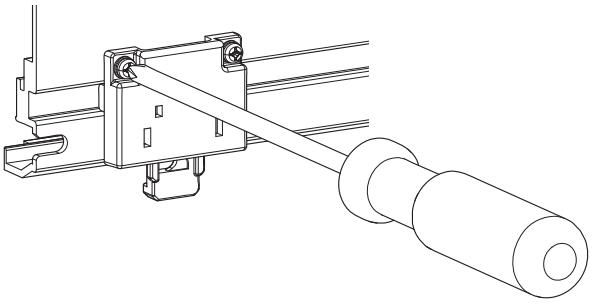
(2)



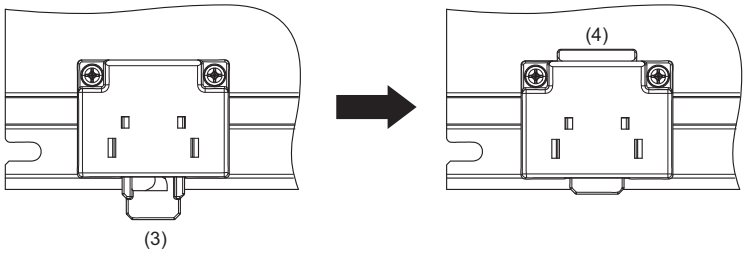
2. Project the hook B (3) of the hook B-C (2) on the downside shown the left figure.



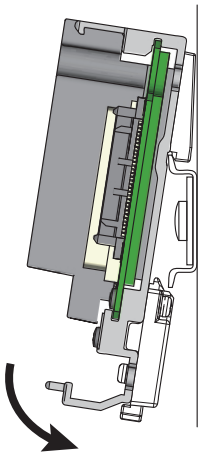
3. Push the tab of the hook B-C into two square holes at the lower part of the base unit until it clicks. (two spots)



4. Tighten the mounting screws (M3×10) of the hook B-C with a screwdriver and fix the hook B-C. (total four spots (two mounting screws per one hook B-C), tightening torque: 0.37 to 0.48N·m)



5. Project the tab (4) of the hook B-C on the upside by pushing up the hook B (3).

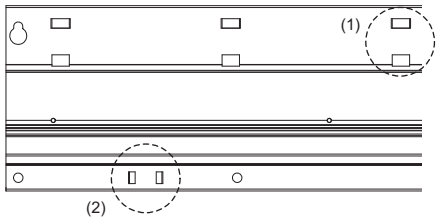


6. Hitch the upper part of the base unit to the DIN rail and push the lower part of the base unit until it clicks.

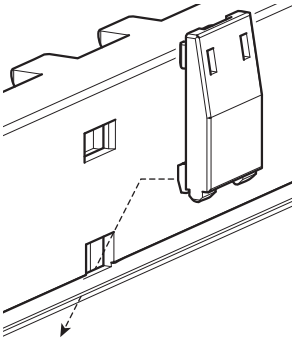
7. Fix the stopper of the DIN rail. (☞ Page 69 Fixing of the stopper)

■RQ extension base unit

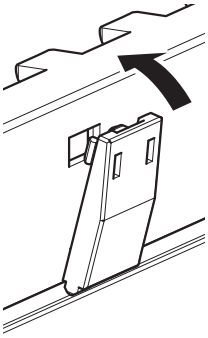
Use the adapters (larger), adapters (smaller), and stoppers included with the MELSEC-Q series DIN rail adapter for the RQ extension base unit.

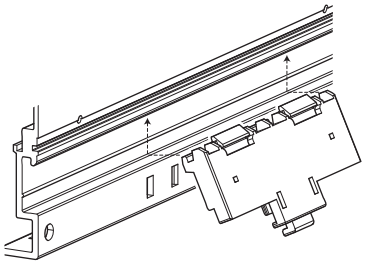


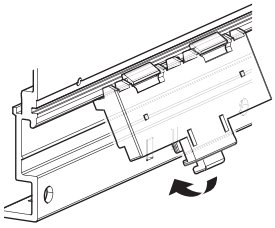
(1) Spot for the hook of the adapter (smaller)
(2) Spot for the hook of the adapter (larger)



1. Insert the hook of the adapter (smaller) into the lower square hole of two square holes at the upper part of the base unit and push the upper part of the adapter until it clicks.



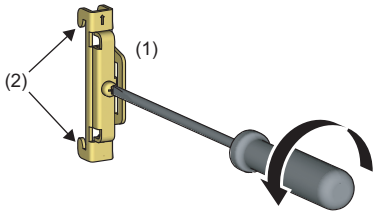


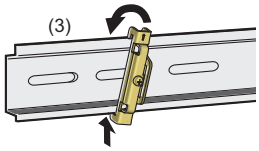


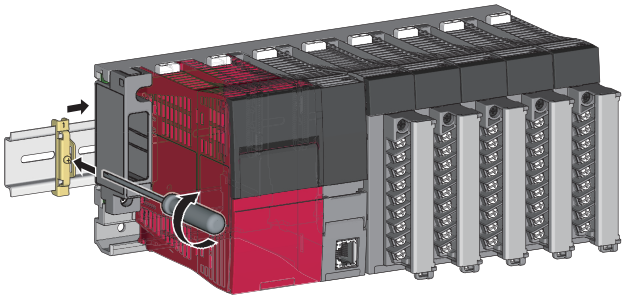
2. Insert the adapter (larger) into the groove of the base unit from below. As the adapter is inserted into the groove, push the lower part of the adapter (larger) into two square holes at the lower part of the base unit until it clocks.
3. Mount the base unit installed the DIN rail adapter on the DIN rail.
4. Fix the stopper of the DIN rail. (☞ Page 69 Fixing of the stopper)

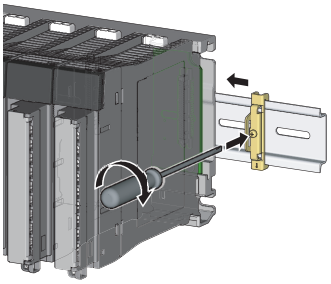
Fixing of the stopper

Fix the stopper to the DIN rail after the base unit installed the DIN rail adapter is mounted on the DIN rail.









1. Loosen the screw at the upper part of the stopper (1).
2. For the stopper fixed to the left side of the base unit, turn up the arrow mark printed on the stopper and hitch the tab (2) at the lower part of the stopper to the DIN rail (3).
3. Hitch the tab at the upper part of the stopper to the upper part of the DIN rail.
4. Fix the stopper on the right side of the base unit upside down for the stopper of the left side.
5. Slide the stopper to the end of the base unit.
6. Tighten the screw of the stopper with a screwdriver. The tightening torque is 1.00 to 1.35N·m.
7. Check that both stoppers are fixed on the DIN rail securely.

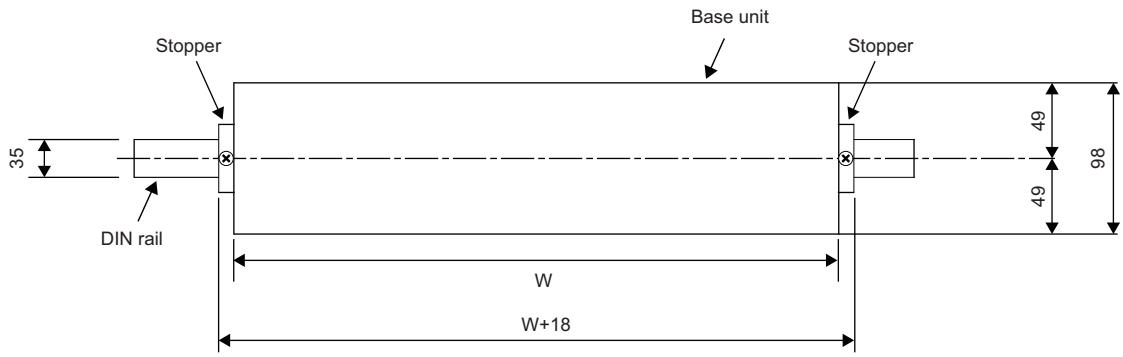
5

Point

When the base unit is mounted on the DIN rail, select the DIN rail in the light of the following dimensions of the stopper.

For the dimensions (W) of the base unit, refer to the following.

☞ Page 52 Performance Specifications of Base Unit

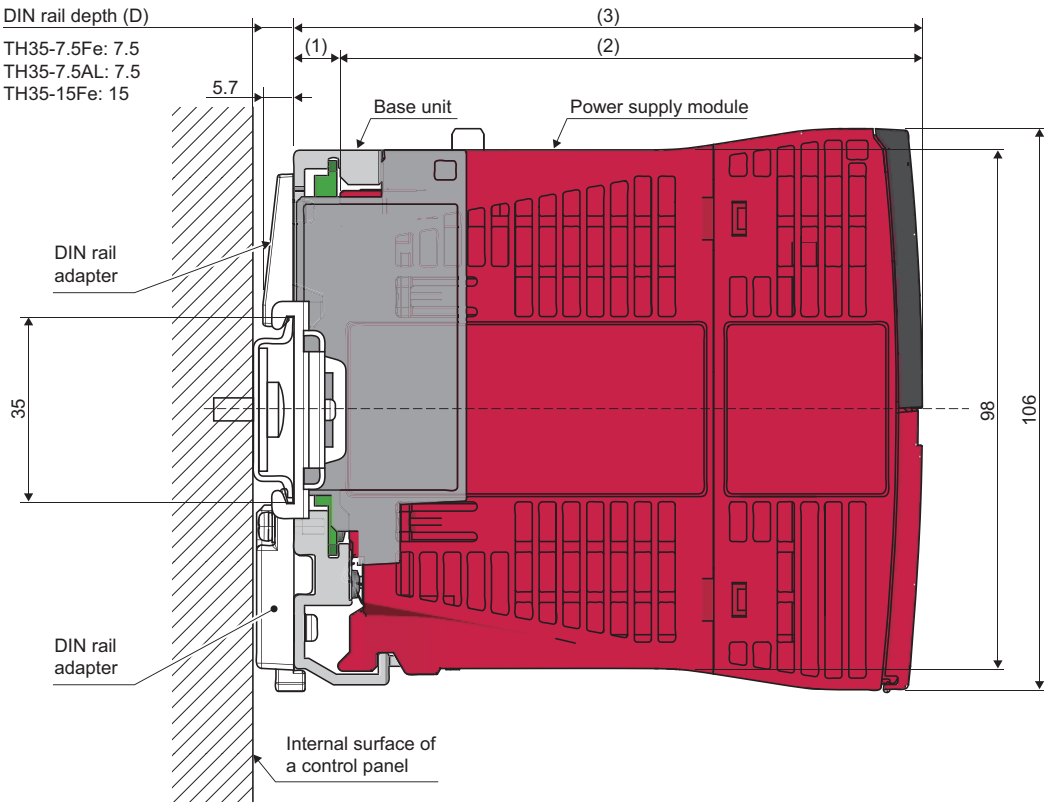


Unit: mm

The method for fixing the DIN rail stopper is an example. Fix the module in accordance with the manual for the DIN rail stopper used.

Lateral dimensions of the base unit with the DIN rail

This section describes the lateral dimensions when the base unit is mounted on the DIN rail.



The following table lists the dimensions (1), (2), and, (3) in the figure when (2) is the power supply module. (1) differs depending on a base unit. (2) and (3) differ depending on the module used.

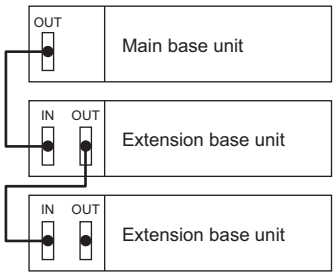
No.	MELSEC iQ-R series main base unit and extension base unit	RQ extension base unit and MELSEC-Q series extension base unit
(1)	8.9mm	7.5mm
(2)	110.0mm	115.0mm
(3)	118.9mm	122.5mm

5.5 Connection Method for the Extension Base Unit

Up to seven base units can be extended including the extension base unit, RQ extension base unit, and MELSEC-Q series extension base unit.

Use an extension cable for the connection with the extension base unit.

Connect the extension cable to the connector of the base unit in order of OUT→IN. Do not connect the extension cable to the connector in order of IN→IN, OUT→OUT, or IN→OUT.



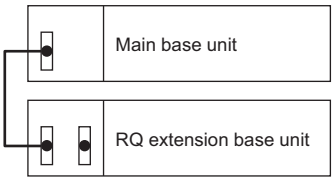
The extension level setting for the extension base unit and RQ extension base unit is not required, because the extension level is set automatically in order near from the main base unit. The setting cannot be changed arbitrarily.

When MELSEC-Q series modules are used

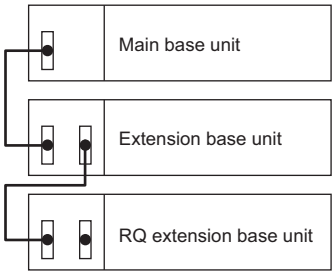
This section describes the connection between the RQ extension base unit and MELSEC-Q series extension base unit.

The RQ extension base unit is connected to the lower level of the main base unit or MELSEC iQ-R series extension base unit with a MELSEC iQ-R series extension cable.

- When the RQ extension base unit is connected to the lower level of the main base unit

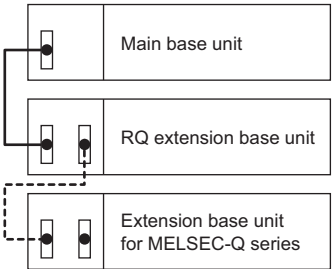


- When the RQ extension base unit is connected to the lower level of the extension base unit

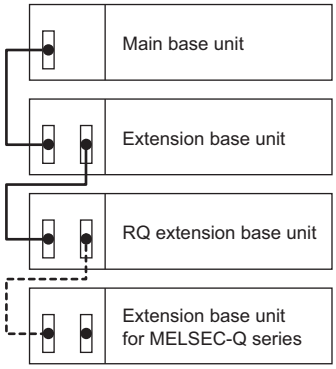


When additional MELSEC-Q series modules are mounted, the MELSEC-Q series extension base unit is connected to the lower level of the RQ extension base unit with a MELSEC-Q series extension cable.

- When the RQ extension base unit is connected to the lower level of the main base unit

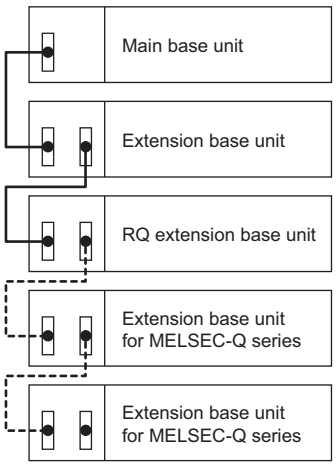


- When the RQ extension base unit is connected to the lower level of the extension base unit



The dot lines show the MELSEC-Q series extension cables.

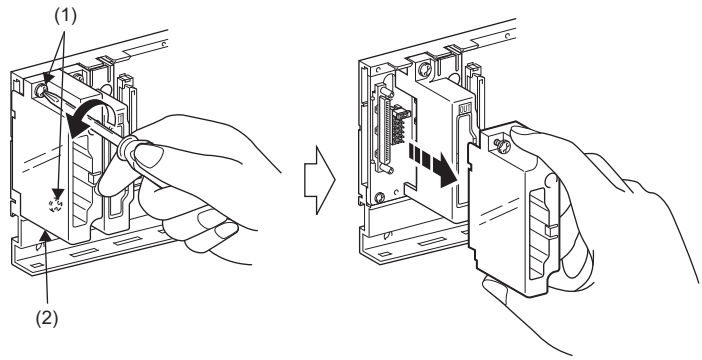
The MELSEC-Q series extension base unit is required the extension level setting with the connector pin for the extension level setting. (☞ Page 72 Setting method with connector pin for extension level setting)



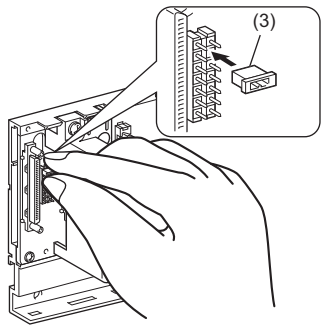
Extension level	Setting necessity
—	—
1	×
2	×
3	○
4	○

Setting method with connector pin for extension level setting

This section describes the extension level setting method for the MELSEC-Q series extension base unit.
Set the extension level surely, because the level is set 1 by the factory default.



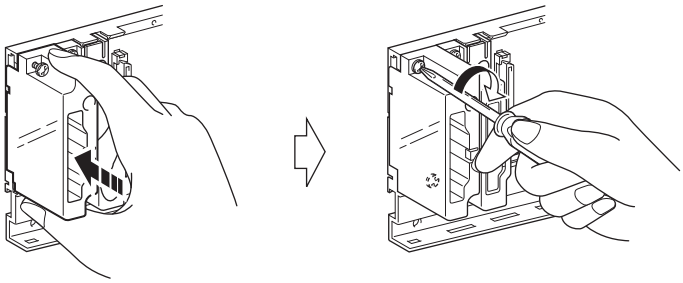
1. The extension level setting connector of the MELSEC-Q series extension base unit is located within the IN side extension connector cover. Loosen the fixing screws (1) of the IN side extension connector cover and remove the extension connector cover (2).



2. Insert the connector pin for the extension level setting (3) into the connector (PIN1) between the IN and OUT sides extension cable connector.

Extension level	2	3	4	5	6	7
Insert position of a connector pin for extension level setting						

3. Set the extension level using the connector pin for the extension level setting in accordance with the left figure.



4. Install the IN side extension connector cover on the MELSEC-Q series extension base unit and tighten the screws of the extension connector cover. (tightening torque: 0.36 to 0.48N·m)

Point

Set the extension level in order of connection, starting from the extension base unit connected to the main base unit.

Set the correct extension level for the extension level setting connector. The incorrect settings as below may cause the incorrect input or incorrect output. When any extension level is skipped, slots cannot be reserved because no slots will be allocated to a skipped extension base unit.

- Any extension level is skipped.
- The same extension level is set to two or more extension base units.
- Two or more connector pins for the extension level setting are inserted, or no connector pins are not inserted.

For details on the extension level setting, refer to the following.

QCPU User's Manual (Hardware Design, Maintenance and Inspection)

Voltage drop when a MELSEC-Q series extension base unit is used

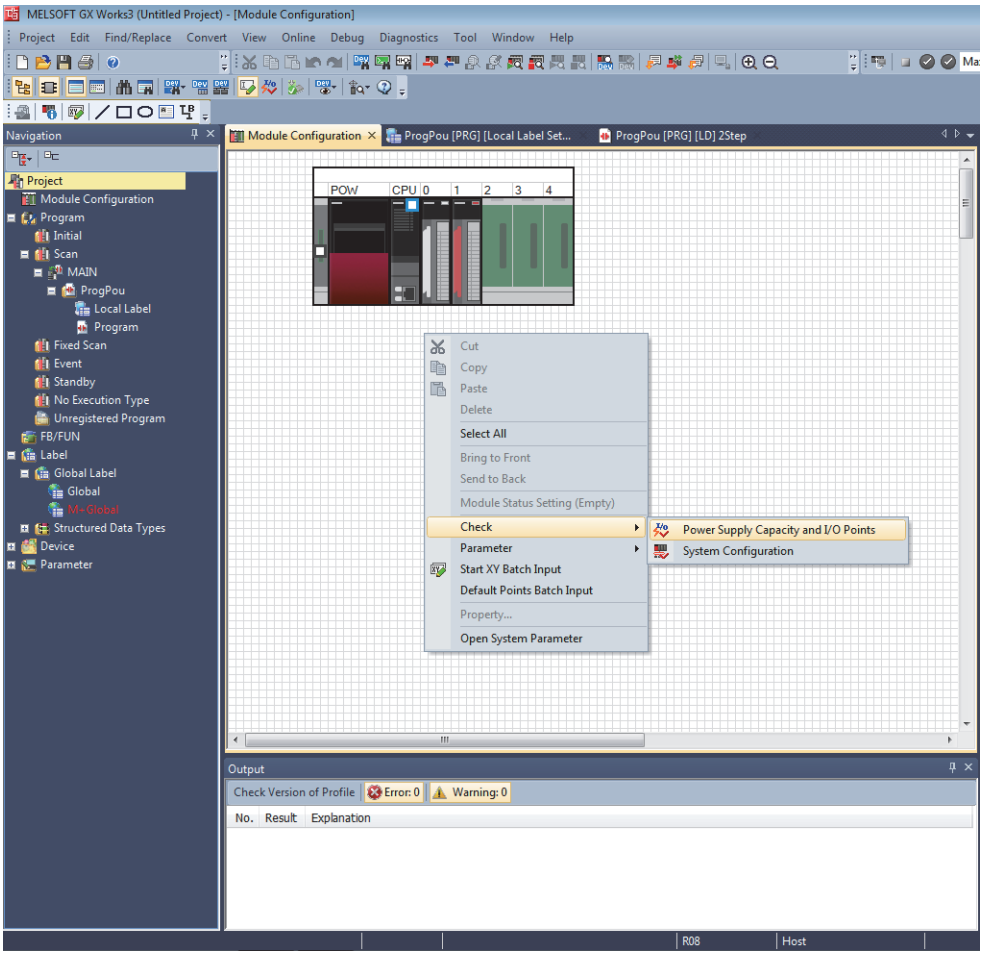
When the Q5□B is used, the Q5□B is supplied with 5VDC from the power supply module on the RQ extension base unit, a voltage drop occurs at extension cables. Incorrect input or output may occur if the specified voltage (4.75VDC or higher) is not supplied to the IN connector of the Q5□B.

When the Q5□B is used, check that the IN connector of the Q5□B set as the last level is supplied with 4.75VDC or higher. Connecting the extension base unit to the lower level of the RQ extension base unit with the shortest extension cable is recommended to reduce the influence of the voltage drop.

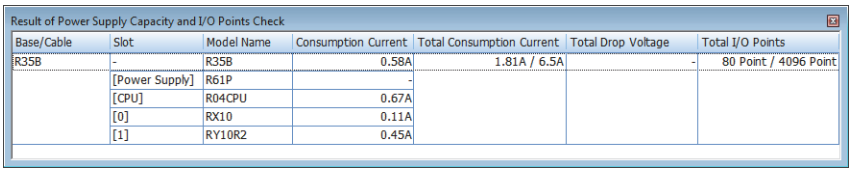
The following table lists the conductor resistance value for each extension cable.

Model	Conductor resistance value for extension cable
QC05B	0.044Ω
QC06B	0.051Ω
QC12B	0.082Ω
QC30B	0.172Ω
QC50B	0.273Ω
QC100B	0.530Ω

The voltage drop can be checked on the engineering tool.

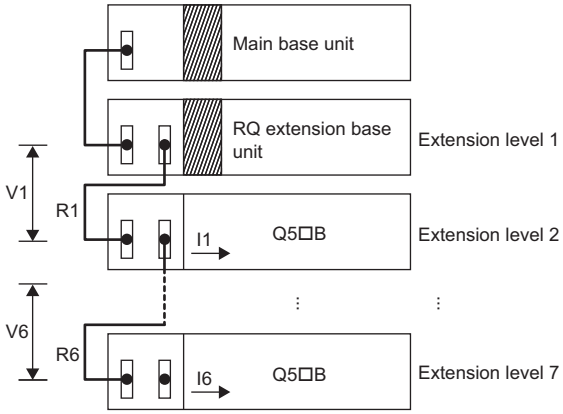


The following window shows the check result.



■When only the Q5□B is connected to the lower level of the RQ extension base unit

The 5VDC output voltage of the power supply module on the RQ extension base unit is set to 4.90VDC (minimum value). Therefore, the Q5□B can be used when the voltage drop at the extension cable is 0.15VDC or lower (4.90VDC - 4.75VDC = 0.15VDC).



Diagonal lines show the power supply modules.

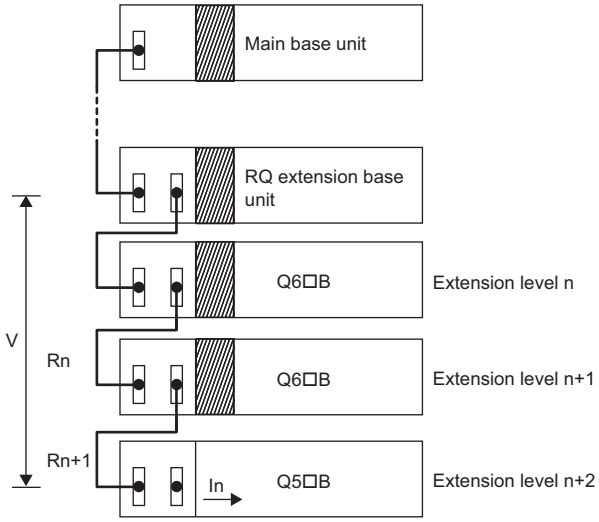
Symbol	Description
V1	Voltage drop at the extension cable between the RQ extension base unit and the Q5□B
Vn	Voltage drop at the extension cable between the Q5□B set as the extension level n and the extension level n+1
R1	Resistance value for the cable between the RQ extension base unit and the Q5□B
Rn	Resistance value for the extension cable between the Q5□B set as the extension level n and the extension level n+1
I1 to I6	Current consumption value (5VDC) at the extension level 2 to 7*1

*1 Sum total (I1 to I6) of the current consumption by the Q5□B and current consumption by I/O modules and intelligent function modules mounted on the Q5□B differs depending on modules mounted on the Q5□B. For detail, refer to the following.
User's manual for the module used

Mounting position of the Q5□B	Voltage drop for the extension cable at each extension level						Sum total (V) of voltage drops to IN connector of the Q5□B
	V1	V2	V3	V4	V5	V6	
Extension level 2	R1·I1	—	—	—	—	—	V=V1
Extension level 3	R1(I1+I2)	R2·I2	—	—	—	—	V=V1+V2
Extension level 4	R1(I1+I2+I3)	R2(I2+I3)	R3·I3	—	—	—	V=V1+V2+V3
Extension level 5	R1(I1+I2+I3+I4)	R2(I2+I3+I4)	R3(I3+I4)	R4·I4	—	—	V=V1+V2+V3+V4
Extension level 6	R1(I1+I2+I3+I4+I5)	R2(I2+I3+I4+I5)	R3(I3+I4+I5)	R4(I4+I5)	R5·I5	—	V=V1+V2+V3+V4+V5
Extension level 7	R1(I1+I2+I3+I4+I5+I6)	R2(I2+I3+I4+I5+I6)	R3(I3+I4+I5+I6)	R4(I4+I5+I6)	R5(I5+I6)	R6·I6	V=V1+V2+V3+V4+V5+V6

■When the Q6□B is connected between the RQ extension base unit and the Q5□B

The 5VDC output voltage of the power supply module on the Q6□B is set to 4.90VDC (minimum value).
Therefore, the Q5□B can be used when the voltage drop at the extension cable is 0.15VDC or lower (4.90VDC - 4.75VDC = 0.15VDC).



Diagonal lines show the power supply modules.

Symbol	Description
V	Voltage drop at the extension cable between the RQ extension base unit and the Q5□B
In	Current consumption (5VDC) when the Q5□B is used as the extension level n+2 (n = 1 to 5), n: Extension level for the Q6□B (Sum total of the current consumption by the Q5□B and current consumption by I/O modules and intelligent function modules mounted on the Q5□B)
Rn	Resistance value for the extension cable between the RQ extension base unit and the Q6□B or the Q6□B and the Q6□B
Rn+1	Resistance value for the extension cable between the Q6□B and the Q5□B

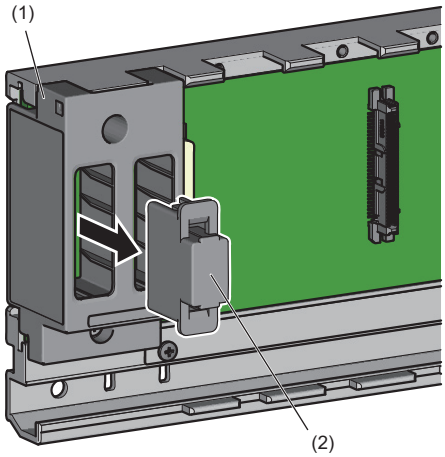
Mounting position		Sum total (V) of the voltage drop at the extension cable from the main base unit to the IN connector of the Q5□B
Q6□B	Q5□B	
Extension level 2	Extension level 3	V=(R1+R2)I1
Extension level 2 to 3	Extension level 4	V=(R1+R2+R3)I2
Extension level 3 to 4	Extension level 5	V=(R1+R2+R3+R4)I3
Extension level 4 to 5	Extension level 6	V=(R1+R2+R3+R4+R5)I4
Extension level 5 to 6	Extension level 7	V=(R1+R2+R3+R4+R5+R6)I5

5.6 Connection/Disconnection of Extension Cable

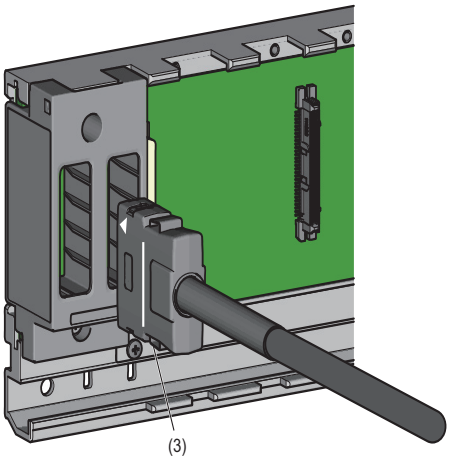
This section describes the connection/disconnection procedure of an extension cable.

MELSEC iQ-R series extension cable

Connection procedure



1. Remove the extension connector protective cover (2) from the extension connector cover (1) before the extension cable is connected to the base unit.



2. Insert the connector (3) of the extension cable with the triangle mark at the left side to the connector of the base unit. Lock the connector securely until it clicks.

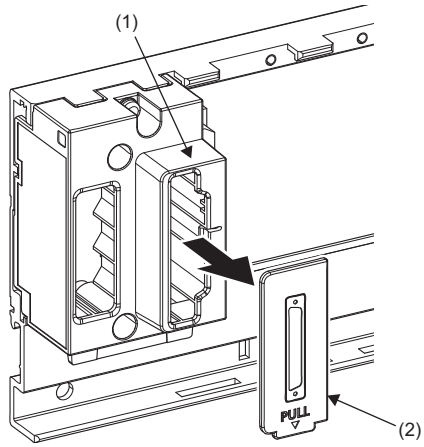
Removal procedure

To disconnect the extension cable, hold the connector part with pushing two lock buttons on the connector.

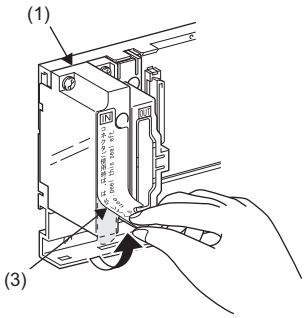
MELSEC-Q series extension cable

Connection procedure

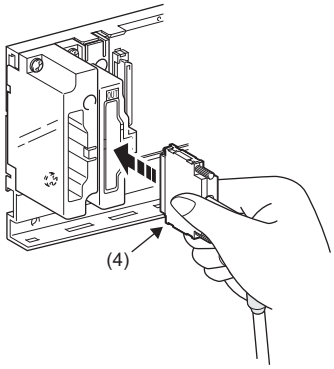
RQ extension base unit



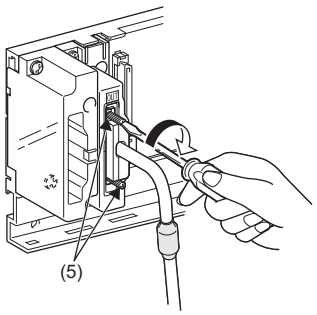
MELSEC-Q series extension base unit



1. Remove the extension connector protective cover (2) from the extension connector cover (1) of the RQ extension base unit before the extension cable is connected to the base unit. For the MELSEC-Q series extension base unit, peel the seal (3) on the extension connector cover (1).



2. Connect the extension cable connector to the connector of the base unit holding the connector part (4) of the extension cable correctly.



3. After connection, tightening the connector fixing screws (5) on the extension cable connector securely. (tightening torque: 0.20N·m)

Removal procedure

Remove the connector part of the extension cable after loosing the fixing screws and checking that the screws are coming off completely.

Handling precautions

- Connect an extension cable to the base unit with the extension connector cover.
- When an extension cable is connected, keep 55mm or more as the minimum bending radius for the cable. Failure to do so may result in malfunction because of the characteristic deterioration or disconnection.
- Keep the overall cable distance within 20m in total length of extension cables. When MELSEC-Q series extension cables are used, keep the overall cable distance within 13.2m in total length of a MELSEC iQ-R series extension cables and the MELSEC-Q series extension cables.
- Do not install extension cables together with the main circuit lines (high voltage and large current).
- For an extension cable, hold the connector part of the cable. Holding a ferrite core installed at both ends of the extension cable may cause the cable disconnection inside the connector.
- Do not displace the ferrite core when the extension cable is used. Doing so may change the characteristics.

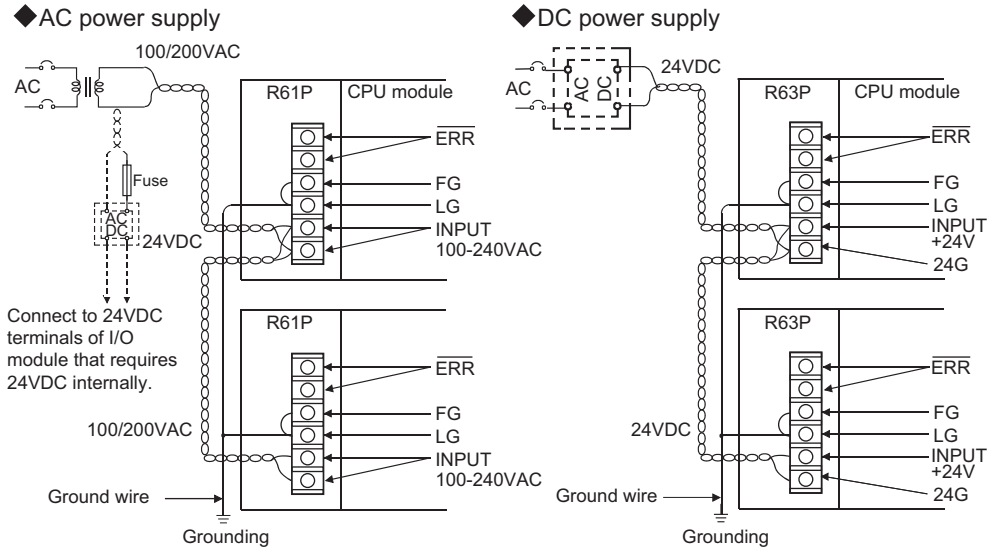
5.7 Wiring

Wiring to the power supply module

This section describes the wiring to the power supply module.
The terminal block of the power supply module has a screw size of M4. Wire cables to the terminal block with the applicable solderless terminal RAV1.25-4 or RAV2-4.
Note, however, that the +24V and 24G terminals of the R62P have a screw size of M3.5. Wire cables to the terminal block with the applicable solderless terminal RAV1.25-3.5 or RAV2-3.5.

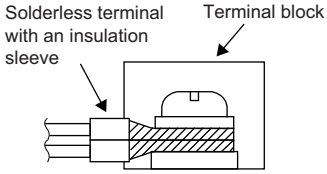
Wiring example

The following figures show wiring examples of the power cables connected to a main base unit and extension base unit and the ground cables.
For wiring examples for each power supply module, refer to the manual included with the power supply module. (📖 Before Using the Product)



Point

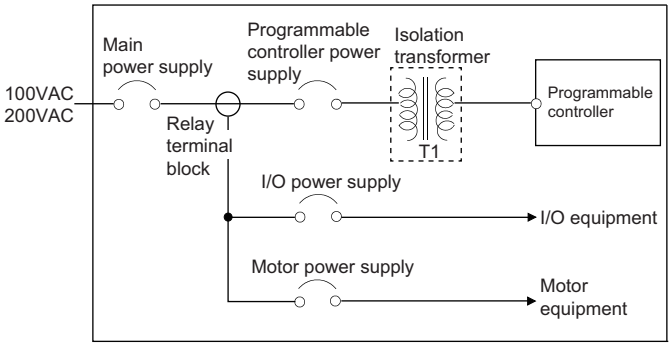
- 100VAC, 200VAC and 24VDC wires must be twisted starting from the terminal connected, and connect modules at the shortest distance. Also, use the thickest wire (maximum 2mm²) to reduce the voltage drop.
- For the wiring to a terminal block, use a solderless terminal.
- To prevent the short-circuit because of loosening screws, use the solderless terminal with an insulation sleeve of 0.8 mm or less. Note that up to two solderless terminals can be connected per terminal block.



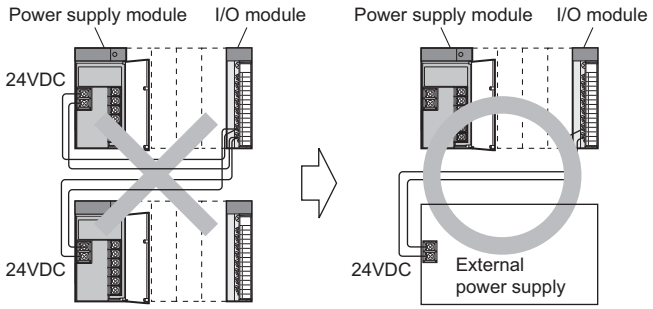
- Ground the LG and FG terminals after short-circuiting them. Failure to do so may be susceptible to the noise. The LG terminal has a half potential of the input voltage.

Precautions

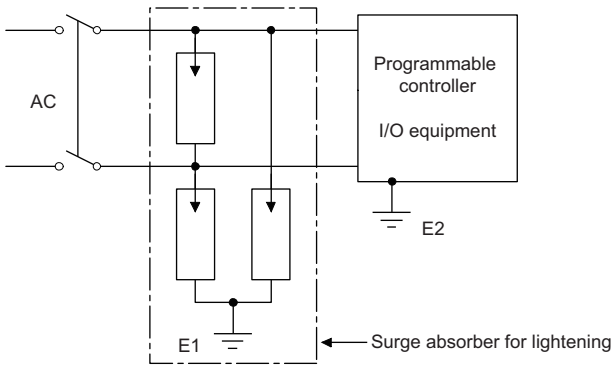
- Wire cables of the programmable controller power supply, I/O power supply, and motor power supply separately as shown below.



- Use an isolation transformer to reduce the noise such as the lightning surge. (☞ Page 116 Isolation transformer)
- Considering the rated current and inrush current of the power supply module, connect a breaker having the appropriate sensing property or an external fuse causing proper blowout. When a single programmable controller is used, connecting a breaker around 10A or an external fuse is recommended.
- Avoid connecting the 24VDC output of two or more power supply modules in parallel to supply power to one I/O module. This parallel connection causes a breakdown of the power supply modules.



- Do not install 100VAC or 24VDC wires together with the main circuit lines (high voltage and large current) or I/O signal wires (including common lines). Keep a distance of 100mm or more between them.
- A momentary power failure may be detected or the CPU module may be reset because of the lightning surge noise. As a measure against the lightning surge noise, connect a surge absorber for lightening as shown below. Using the surge absorber for lightening can reduce the influence from the lightening.



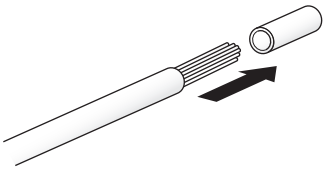
Point

- Separate the ground of the surge absorber for lightening (E1) from that of a programmable controller (E2).
- Select a surge absorber for lightening which the power supply voltage does not exceed the maximum allowable circuit voltage even when line voltage is maximum.

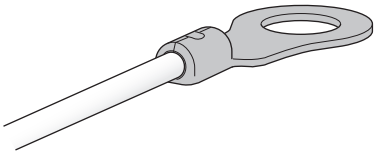
Wiring to a screw terminal block

This section describes the wiring to an 18-point screw terminal block.

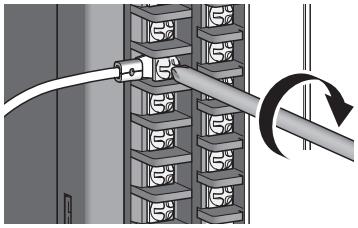
Wiring method



1. Strip the insulating coating of a cable.



2. Connect a solderless terminal to the stripped part of the cable. For applicable solderless terminals, refer to the specifications of each module.

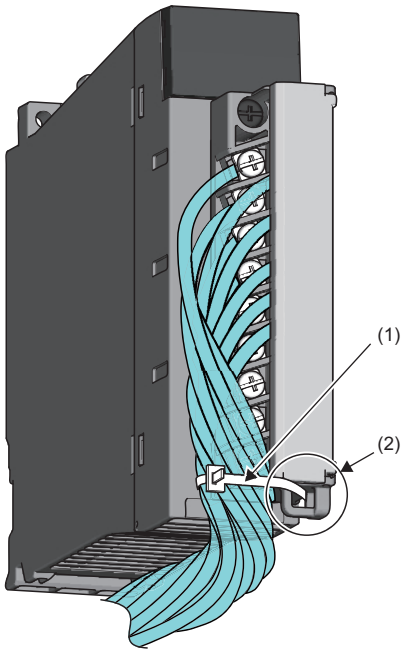


3. Wire the solderless terminal to an 18-point screw terminal block. For the terminal layout, refer to the specifications of each module.

Point

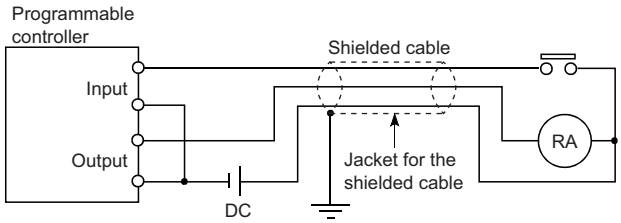
Wired cables can be fixed to the 18-point screw terminal block by using a fixing band (width: 3mm, thickness: 1mm or less).

Fix the cables by passing the fixing band (1) to the hole for fixing band (2) as shown below.



Precautions

- Use UL listed solderless terminals if necessary for UL compliance, and for processing, use a tool recommended by their manufacturer. Note that a solderless terminal with an insulation sleeve cannot be used.
- The wires used for connection to the terminal block must be 0.3 to 0.75mm² in core and 2.8mm or less in outside diameter.
- Wire the input and output lines away from each other.
- When the lines cannot be wire away from the main circuit and power lines, use a batch-shielded cable and ground it on the programmable controller side. In some cases, ground it in the opposite side.



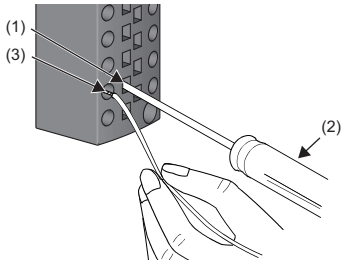
- Ground the piping securely where wiring runs through the piping.
- Install a 24VDC input line away from the 100VAC and 200VAC lines.
- Wiring of 200m or longer will occur the current leakage because of the line capacity, resulting in a fault.
- As a measure against the lightning surge, separate the AC wiring and DC wiring and connect a surge absorber for lightning. (☞ Page 87 Precautions)
- Failure to do so may cause the failure of an I/O device because of the lightning.

Wiring to a spring clamp terminal block

This section describes the wiring to a spring clamp terminal block.

Wiring method

■Connecting a cable



1. Securely insert a spring clamp terminal block tool (2) to the Q6TE-18SN tool insertion opening (square hole) (1) deeply and straight.
2. Insert a cable or bar solderless terminal to the wire insertion opening (round hole) (3) and pull out the spring clamp terminal block tool.
3. Pull the cable or bar solderless terminal lightly, check that it is clamped securely.

■Disconnecting a cable

Securely insert the spring clamp terminal block tool to the Q6TE-18SN tool insertion opening (square hole) deeply and straight, and pull out the bar solderless terminal or cable.

Wiring precautions

- Insert only one wire into the circular shaped hole of the spring clamp terminal block. Inserting two or more wires may result in a poor contact to the terminal part.
- For the wire strip length, satisfy the specifications in this manual. Failure to do so may result in electric shock or short circuit between adjacent terminals because the conductive part. If the wire strip length is too short, it may result in the poor contact to the spring clamp terminal part.
- Do not use the wire soldered the head. Poor contact or insertion-extraction failure to the spring clamp terminal block may occur because of the difference of the solder processing result.

Precautions for using a spring clamp terminal block tool

Observe the following precautions for using a spring clamp terminal block tool. Failure to do so may result in the damage to the spring clamp terminal part or resin part of the terminal block.

- Use the dedicated spring clamp terminal block tool.
- Do not insert a bar solderless terminal or cable before inserting the spring clamp terminal block tool to the tool insertion opening.
- Insert the spring clamp terminal block tool to the tool insertion opening straight.

Wiring a connector

This section describes how to wire connectors for external devices.

Applicable connectors

The following reference products are the connector types and crimping tool for a module.

■40-pin connectors

Type	Model	Applicable wire size
Soldering type connector (straight type)	A6CON1	0.088 to 0.3mm² (28 to 22 AWG) (stranded wire)
Crimping type connector (straight type)	A6CON2	0.088 to 0.24mm² (28 to 24 AWG) (stranded wire)
Soldering type connector (dual purpose (straight/oblique) type)	A6CON4	0.088 to 0.3mm² (28 to 22 AWG) (stranded wire)

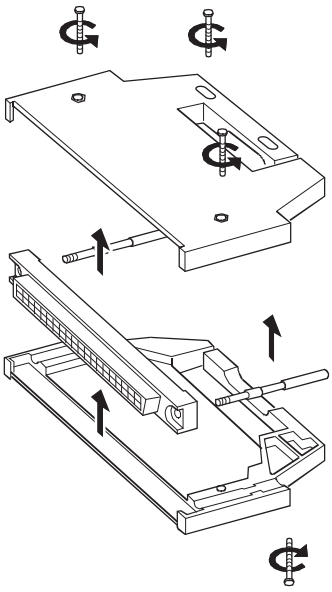
■40-pin connector crimping tool

Manufacturer	Type	Model	Contact
FUJITSU COMPONENT LIMITED	Crimping tool	FCN-363T-T005/H	www.fcl.fujitsu.com/en

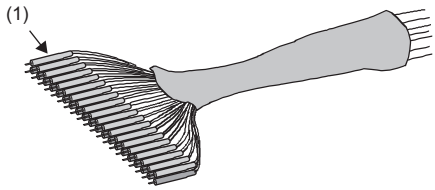
For how to wire the connector and how to use the crimping tool, contact the manufacturer.

Wiring method

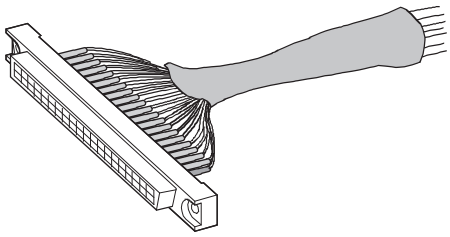
■A6CON1, A6CON4



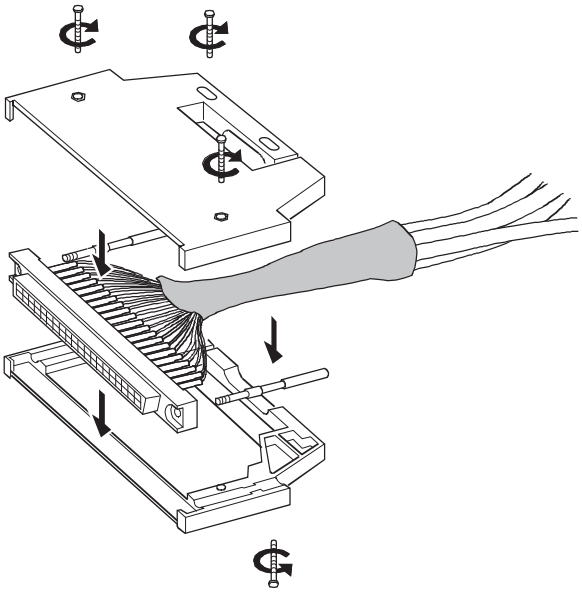
1. Loosen the four fixing screws on the connector and remove the screws. Open the connector cover from the connector side.



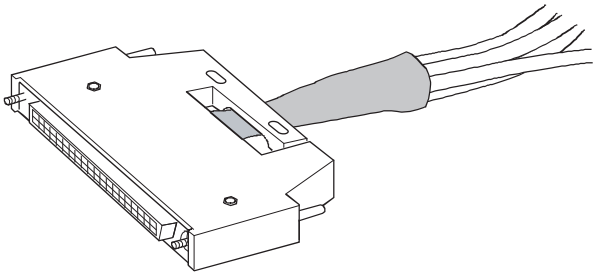
2. Solder the wires and coat them with heat shrinkable tubes (1).



3. Check the terminal layout and wire them to the connector. When the connector is plugged into an I/O module, an FG wire needs not to be installed.



4. Place the connector on one side of the connector cover and put the fixing screws through the screw holes. Cover another connector cover onto the connector.



5. Tighten the four screws.

■A6CON2

The following table shows the specifications of the FCN-363T-T005/H used for the A6CON2.

Applicable wire size	Cross-section area of wire	Crimp height	Sheath outside diameter of wire	Length of stripped wire part
AWG24	0.20 to 0.24mm²	1.25 to 1.30	Φ1.2 or less	3.0 to 4.0
AWG26	0.13 to 0.16mm²	1.20 to 1.25	Φ1.2 or less	3.0 to 4.0
AWG28	0.088 to 0.096mm²	1.15 to 1.20	Φ1.2 or less	3.0 to 4.0

Wiring of the A6CON2 requires the special tool.

For how to use and adjust the tool, contact the manufacturer.

Point

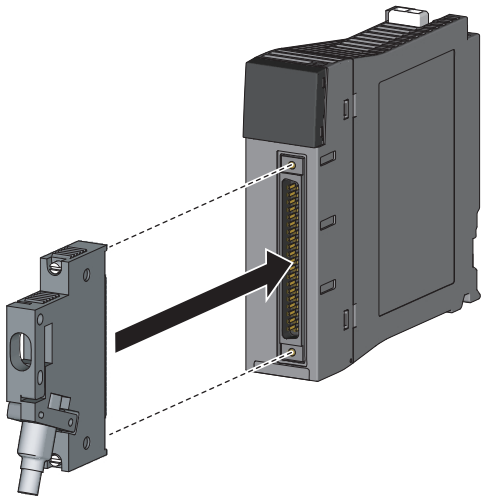
Arrangement for a flat cable is in the order of A1 → B1 → A2 ·····

(The following figure shows a connector viewed from the plug-in side.)

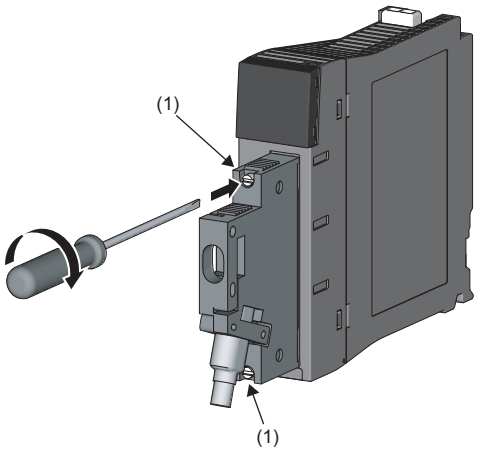
B20	B19	B18	B17	B16	B15	B14	B13	B12	B11	B10	B09	B08	B07	B06	B05	B04	B03	B02	B01
A20	A19	A18	A17	A16	A15	A14	A13	A12	A11	A10	A09	A08	A07	A06	A05	A04	A03	A02	A01

Plugging a connector

■Installation procedure



1. Plug the connector into the slot on the module.



2. Tighten the two connector screws (M2.6) (1).

■Removal procedure

Loosen the two connector screws and pull out the connector from the module straight.

Precautions

- Crimp or solder the connector for an external device (A6CON□) correctly.
- Connect the A6CON□ to the module securely and tighten the two connector screws.
- Tighten the connector screws within the specified torque range.

Screw	Tightening torque range
Connector screw (M2.6)	0.20 to 0.29N·m

- Place the cables in a duct or clamp them. If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact.
- Use copper wire with a temperature rating of 75℃ or higher for the connector.
- Use UL listed connectors if necessary for UL compliance.

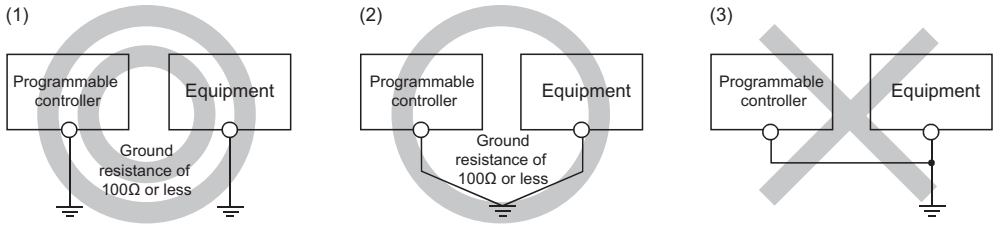
Point

To ensure that the connector used maintains EMC and Low Voltage Directives, please refer to the following.
☞ Page 113 EMC and Low Voltage Directives
Even when compliance with the EMC Directive and Low Voltage Directives is not required, configuring the system that complies with the EMC Directive may reduce external noise.

Grounding

Observe the following:

- Provide independent grounding when possible. Ground the FG and LG terminals to the protective ground conductor dedicated to the programmable controller (ground resistance: 100 ohms or less).
- If independent grounding cannot be provided, employ (2) Shared grounding shown below.



(1) Independent grounding: Recommended
(2) Shared grounding: Allowed
(3) Common grounding: Not allowed

- Use the thickest cable (maximum of 2mm²). Bring the grounding point close to the programmable controller as much as possible so that the ground cable can be shortened.

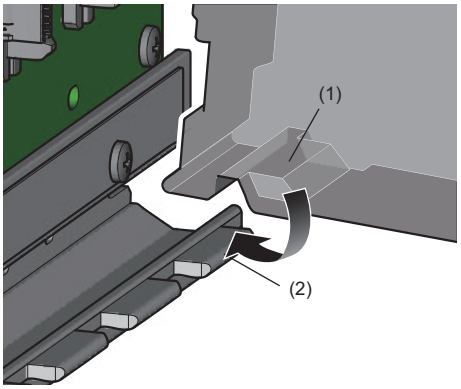
5.8 Mounting/Removing a Module or Terminal Block

Mounting/removing a module

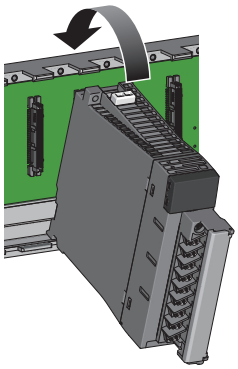
This section describes the procedure of mounting/removing a module on/from a base unit.
Turn off a system when mounting/removing the module.
To the connector where no module is mounted, fit the blank cover module (RG60) securely to prevent dust from entering.

Main base unit, extension base unit

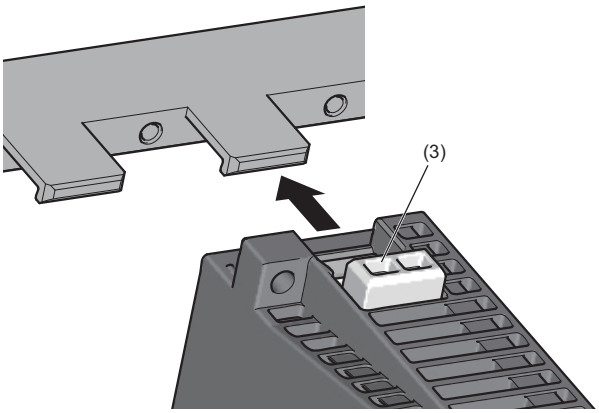
■Mounting procedure



1. Place the concave part (1) of a module onto the guide (2) of the base unit.



2. Push in the module until the module fixing hook (3) snaps into place.
3. Check that the module fixing hook (3) hangs the base unit and the module is mounted on the base unit securely.

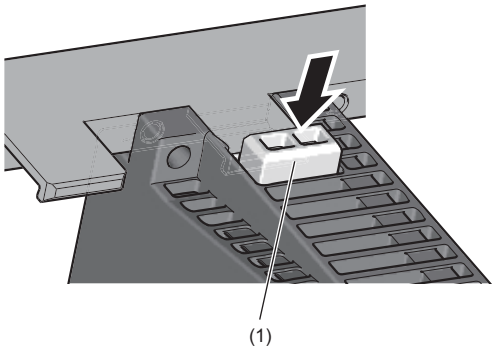


Point

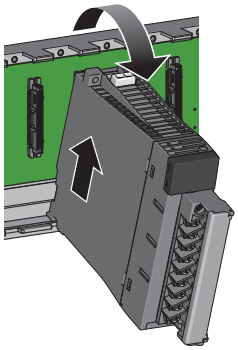
When using the programmable controller in an environment of frequent vibration or impact, secure the module to the base unit using screws.

- Module fixing screw: M3×12 (sold separately)

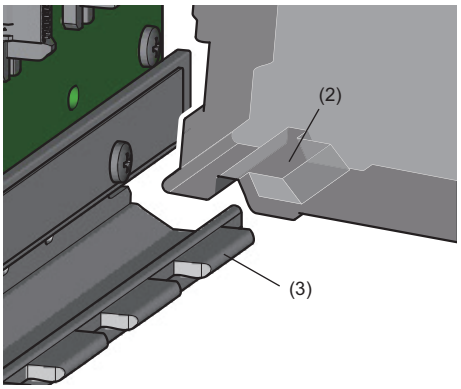
■Removal procedure



1. Support the module with both hands and securely press the module fixing hook (1) with your finger.



2. Pull the module straight supporting it at its bottom while pressing the module fixing hook (1).
3. While lifting the module, remove the concave part (2) from the guide (3) of the base unit.

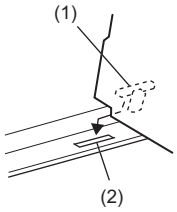


Point

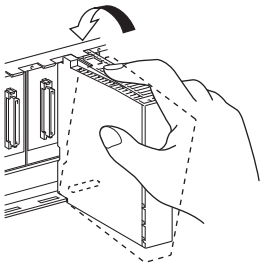
- When module fixing screws are used, remove the screws first and module from the base unit. Failure to do so may damage the module.
- The module surface temperature may be high immediately after power-off. When the module is removed, pay attention to the burn injury.

RQ extension base unit

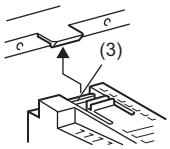
■Mounting procedure



1. Insert the module fixing projection (1) into the module fixing hole (2).



2. Push in the module until the module fixing hook (3) snaps into place.



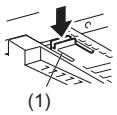
3. Check that the module fixing hook (3) hangs the base unit and the module is mounted on the base unit securely.

Point

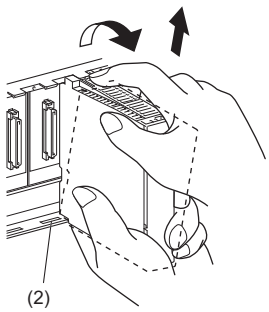
When using the programmable controller in an environment of frequent vibration or impact, secure the module to the base unit using screws.

- Module fixing screw: M3×12 (sold separately)

■Removal procedure



1. Support the module with both hands and securely press the module fixing hook (1) with your finger.



2. Pull the module straight supporting it at its bottom while pressing the module fixing hook (1).
3. While lifting the module, remove the module fixing projection part from the module fixing hole (2).

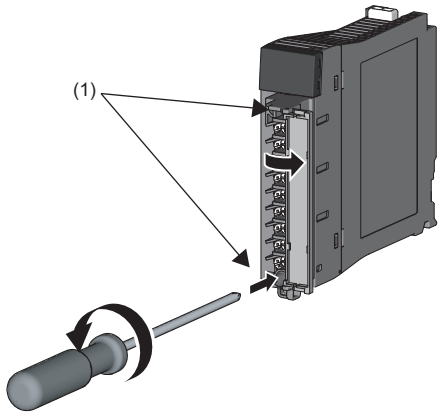
Point

- When module fixing screws are used, remove the screws first and module from the base unit. Failure to do so may damage the module.
- The module surface temperature may be high immediately after power-off. When the module is removed, pay attention to the burn injury.

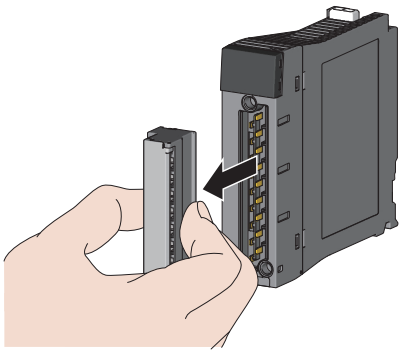
Installing/removing a terminal block

This section describes the removal and installation procedure of the terminal block of a module.

Removal procedure



1. Open the terminal cover and loosen two terminal block mounting screws (1).



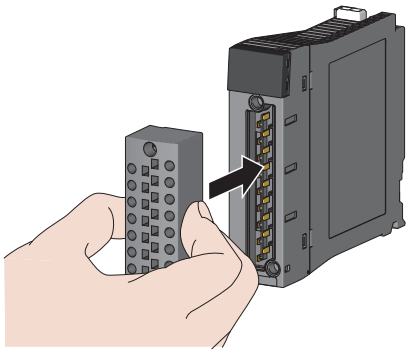
2. Remove the terminal block.

Installation procedure

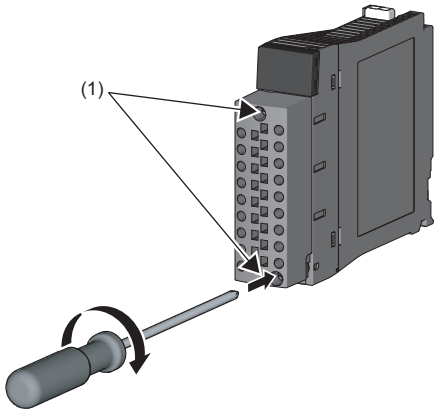
■Installing an 18-point screw terminal block

After installing the terminal block, tighten two terminal block mounting screws.

■Installing a spring clamp terminal block



1. Remove the protective cap from the Q6TE-18SN.



2. Install the Q6TE-18SN to the module and tighten the terminal block mounting screws within the specified torque range.

Handling precautions

This section describes precautions for the handling of a module.

- Do not drop or apply strong shock to the module, SD memory card, extended SRAM cassette, terminal block connector, and pin connector.
- Do not disassemble or modify the modules and extended SRAM cassettes. Doing so may cause failure of the module.
- Tighten each screw within the following torque range.

Screw	Tightening torque range
Module fixing screw (M3×12)	0.36 to 0.48N·m
Terminal block screw (M3)	0.42 to 0.58N·m
Terminal block mounting screw (M3.5)	0.66 to 0.89N·m
Connector screw (M2.6)	0.20 to 0.29N·m
Terminal screw (M4) of a power supply module	1.02 to 1.38N·m
Terminal screw (M3.5) of a power supply module	0.66 to 0.89N·m

- Mount a power supply module on the slot for the module (except the base unit which is not required the power supply module). Failure to do so cannot guarantee the operation because of the unstable voltage even if the module which is mounted on the base unit operates.
- Do not install extension cables together with the main circuit lines (high voltage and large current). Keep a distance of 100mm or more between them.
- Malfunction of the module may occur if the foreign matter such as the conductive dust contacts with the module surface other than front during the operation. Protect the module by attaching the blank cover module (RG60) for the connector which is not mounted a module.

6 MAINTENANCE AND INSPECTION

This chapter describes items that must be maintained or inspected daily or periodically to properly use a programmable controller in optimal condition at all times.
When using the C Controller module, refer to the following.
MELSEC iQ-R C Controller Module User's Manual (Startup)

6.1 Daily Inspection

This section describes items that must be inspected daily.

Item	Inspection Item		Inspection method	Judgment criteria	Corrective action
1	Mounting of the base unit	Loose	Check that mounting screws are not loose and the cover is not dislocated.	The screws and cover must be fixed.	Retighten the screws.
2	Mounting of the module	Loose	Check that the module is mounted and the module fixing hook is fixed securely.	The module must be mounted and the module fixing hook must be fixed.	Fix the module fixing hook securely.
3	Connection status	Terminal screw loosening	Check for the terminal screw loosening.	The terminal screws must not be loose.	Retighten the terminal screws.
		Clearance between the solderless terminals	Check for the clearance between the solderless terminals.	The proper clearance must be provided between solderless terminals.	Provide the proper clearance.
		Connector loosening	Check for the cable connector loosening.	The cable connector must not be loose.	Connect the connector with no loosening securely.
4	LED status	POWER LED (power supply module)	Check that the LED is on.	The LED must be on.	When the judgment criteria is not satisfied, refer to the following and take the corrective action. User's Manual (Application) for the module used
		READY LED and RUN LED	Check that the LED is on.	The LED must be on.	
		ERROR LED, ERR LED, P ERR LED, and L ERR LED	Check that the LED is off.	The LED must be off.	
		BATTERY LED (CPU module)	Check that the LED is off.	The LED must be off.	
		USER LED (CPU module)	Check that the LED is off.	The LED must be off.	
		I/O indicator LED (I/O module)	Check that the LED is on or off.	The LED turns on when I/O signals are on. The LED turns off when I/O signals are off.	

6.2 Periodic Inspection

This section describes items that must be inspected one or two times every six months to one year.
When the equipment has been relocated or modified, or wiring layout has been changed, inspect the items.

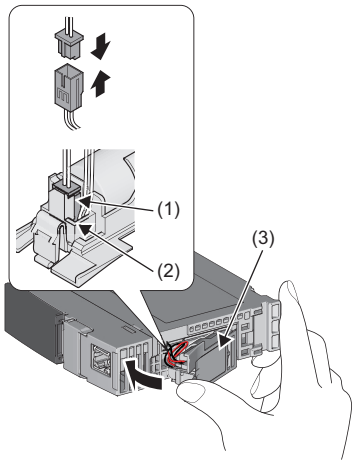
Item	Inspection Item		Inspection method	Judgment criteria	Corrective action
1	Environment	Ambient temperature*1	Measure the temperature by using a thermometer.	0 to 55℃	Create the environment that satisfies the judgment criteria
		Ambient humidity	Measure the humidity by using a hygrometer.	5 to 95%RH	
		Atmosphere	Measure corrosive gases.	No corrosive gases	
2	Power supply voltage check		Measure a voltage between the terminals of 100/200VAC and 24VDC.	85 to 264VAC	Change the supply power.
				15.6 to 31.2VDC	
3	Installation	Looseness and rattling	Touch the module to check for the looseness and rattling.	The module must be mounted securely.	Retighten the screws. If the module is loose, fix the module with screws.
		Attachment of dirt and foreign matter	Check visually.	Dirt and foreign matter must not be attached.	Remove them. Clean the programmable controller.
4	Connection status	Terminal screw loosening	Check for the terminal screw loosening.	The terminal screws must not be loose.	Retighten the screws.
		Clearance between the solderless terminals	Check visually.	The proper clearance must be provided between solderless terminals.	Provide the proper clearance.
		Connector loosening	Check visually.	The cable connector must not be loose.	Connect the connector with no loosening securely.
5	Battery		Check the BATTERY LED on the CPU module.	The LED must be off.	Replace the battery when the LED is on.
			Check the length of term after purchasing the battery.	The battery must not be used more than five years.	Replace the battery if it has been used more than 5 years.
			Check that SM51 or SM52 is turned off using a engineering tool.	SM51 or SM52 must be off.	Replace the battery when SM51 or SM52 is on.
6	Module diagnostics		Check an event history using the module diagnostics.	An event history must not be updated.	GX Works3 Operating Manual
7	Maximum scan time		Check the values of SD526 and SD527 using a engineering tool.	Maximum scan time must be within the allowable range given in the specification of the system.	Specify causes that increase the scan time. Check the operation status of the trigger signal that passes through a loop if loop positions exist in the sequence program.

*1 The temperature in the control panel installed a programmable controller is called the ambient temperature.

Battery replacement procedure

When the life of the battery comes to an end, replace the battery, following the procedure below.
Power on the programmable controller for ten minutes or longer before removing the battery from the CPU module. Power off the programmable controller, and then replace the battery.
The CPU module holds the data on the device/label memory for three minutes (backup power time) by the capacitor even after the battery is removed. Note that the data on the device/label memory may be erased if the backup power time is exceeded. Replace the battery within three minutes.

Replacement procedure for the Q6BAT

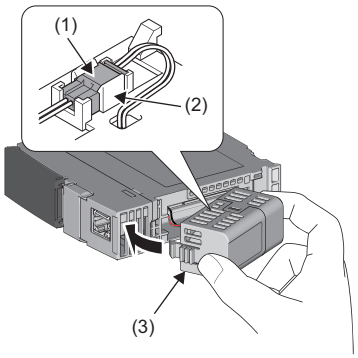


1. Back up the program and data.
2. Power off the programmable controller.
3. Remove the CPU module from the base unit.
4. Open the battery cover located on the bottom of the CPU module.
5. Disconnect the connector plug of the Q6BAT from the jack of the CPU module. When disconnecting the connector, hold the connector part so that the cables are not damaged.
6. Remove the Q6BAT from the battery cover.
7. Set a new Q6BAT to the cover in the right direction (with the positive terminal of the battery facing the connector holder).
8. Securely insert the connector plug of the Q6BAT to the jack of the CPU module. Set the connector (1) to the connector holder (2) on the cover.
9. Close the battery cover (3).
10. Mount the CPU module back on the base unit.
11. Power on the programmable controller.
12. Using the engineering tool, check that SM51 (Battery low latch) is off.

If SM51 is off, the battery has been replaced successfully.
If SM51 is on, the battery may not be installed properly. Repeat the procedure from step 2. If SM51 remains on, the possible cause is a hardware failure of the battery. Perform the procedure with a different battery.

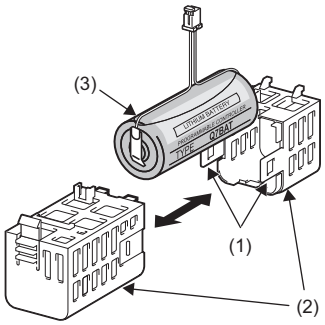
Replacement procedure from the Q6BAT to the Q7BAT-SET

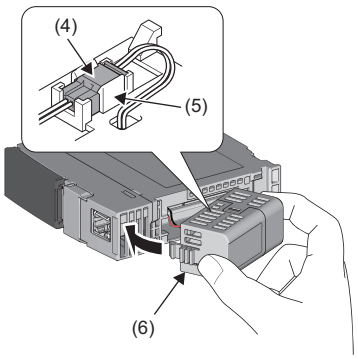
Replace it by the following procedure.



1. Back up the program and data.
2. Power off the programmable controller.
3. Remove the CPU module from the base unit.
4. Open the battery cover located on the bottom of the CPU module.
5. Disconnect the connector plug of the Q6BAT from the jack of the CPU module.
6. Securely insert the connector plug of the Q7BAT-SET to the jack of the CPU module.
7. Set the connector (1) into the connector holder (2) of the battery holder.
8. Attach the Q7BAT-SET (3) to the CPU module.

Replacement procedure for the Q7BAT





1. Back up the program and data.
2. Power off the programmable controller.
3. Remove the CPU module from the base unit.
4. Remove the battery holder.
5. Disconnect the connector plug of the Q7BAT from the jack of the CPU module. When disconnecting the connector, hold the connector part so that the cables are not damaged.
6. Separate the holder (2) into two pieces by disengaging the latches (1) on both sides of the holder, and remove the Q7BAT (3).
7. Set the new Q7BAT to the holder in the right direction, checking the positive/negative terminal markings. Connect the holder back into one piece, placing the battery cable into the hole at the connection part. (Press the holder pieces until they click.)
8. Securely insert the connector plug (4) of the Q7BAT to the jack of the CPU module. Set the connector to the connector holder (5) on the cover.
9. Attach the battery holder (6) to the CPU module.
10. Mount the CPU module back on the base unit.
11. Power on the programmable controller.
12. Using the engineering tool, check that SM51 (Battery low latch) is off.

If SM51 is off, the battery has been replaced successfully.
If SM51 is on, the battery may not be installed properly. Repeat the procedure from step 2. If SM51 remains on, the possible cause is a hardware failure of the battery. Perform the procedure with a different battery.

APPENDICES

Appendix 1 Checking Production Information and Firmware Version

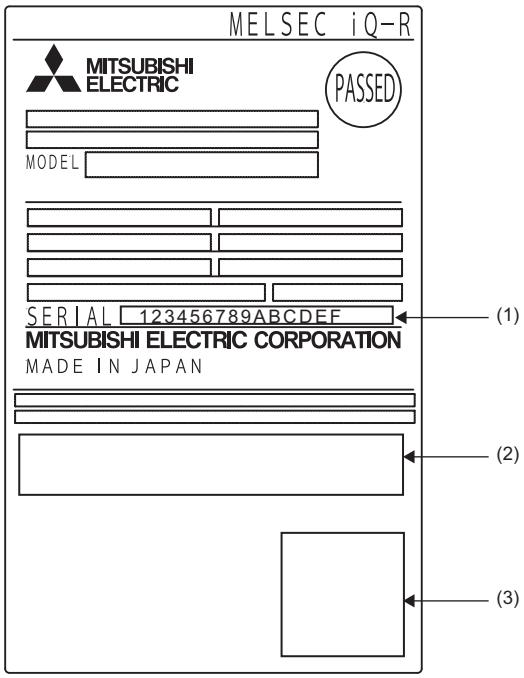
This section describes how to check the production information of the module or firmware version.

Checking on the module

■Rating plate

The rating plate is located on the side of the module.

The production information (16 digits) of the module is shown on the SERIAL field.



(1) Production information (16 digits)
(2) Relevant regulation standards
(3) QR code

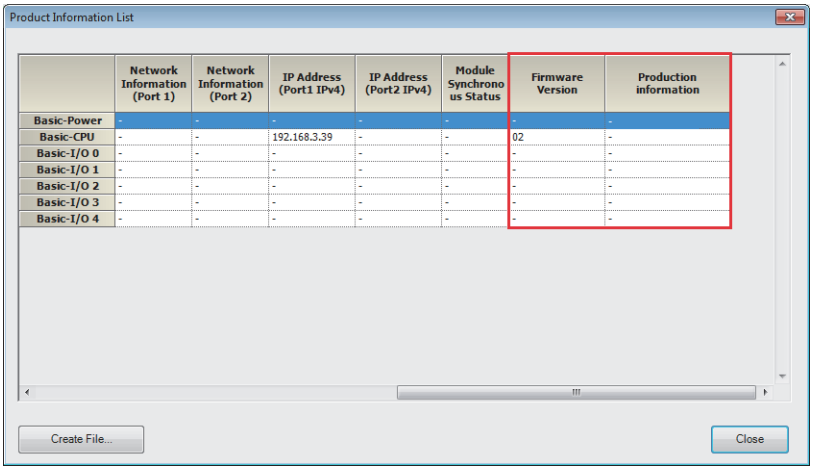
■Production information marking

The production information (16 digits) of the module is shown on the marking in front of the module.

Checking on the engineering tool

The production information (16 digits) of the module or firmware version can be checked on the engineering tool.

[Diagnostics] ⇨ [System Monitor] ⇨ [Product Information List] button



Appendix 2 Differences Between MELSEC iQ-R Series and MELSEC-Q Series

This section describes differences between the MELSEC iQ-R series and MELSEC-Q series.

Hardware configuration

Item		MELSEC iQ-R series	MELSEC-Q series
Main base unit	Number of slots	5, 8, 12	2, 3, 5, 8, 12
	Slim type base unit	None	Available
	Redundant power supply system	None	Available
Extension base unit	Number of slots	5, 8, 12	2, 3, 5, 8, 12
	Base unit (not required power supply module)	None	Available
	Redundant power supply system	None	Available
Extension cable	Overall cable distance	20m	13.2m
	Shortest cable	0.6m (RC06B)	0.45m (QC05B)
	Longest cable	5.0m (RC50B)	10m (QC100B)
Power supply module	Redundant power supply system	None	Available
	Life detection power supply module	None	Available
Battery for CPU module		Q6BAT, Q7BAT	Q6BAT, Q7BAT, Q8BAT
GOT connection*1		Bus connection not available	Bus connection available
MELSEC-AnS/MELSEC-A series		Not available	Available

*1 The GOT that can be used and connection method differ between those series. (📖 Connection Manual (Mitsubishi Product) for GOT used)

Function

Item		MELSEC iQ-R series	MELSEC-Q series
Application function (standard function)	MUX(_E)	Input value of (n): 0 to 27	Input value of (n): 1 to 28

Appendix 3 How to Use MELSEC-Q Series Modules

This section describes how to use MELSEC-Q series modules. For the modules which can be used, refer to the following.

☞ Page 22 MELSEC-Q series

When using the C Controller module, refer to the following.

📖 MELSEC iQ-R C Controller Module User's Manual (Startup)

Window change between GX Works2 and GX Works3

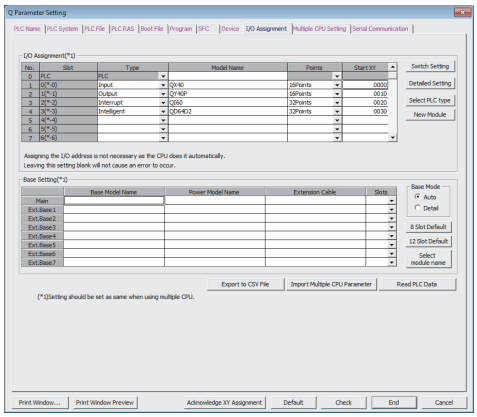
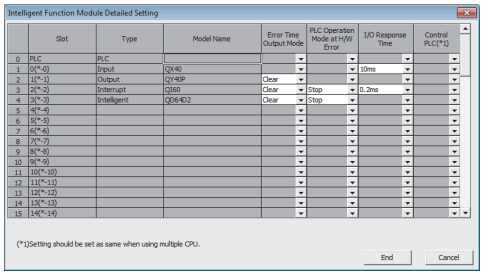
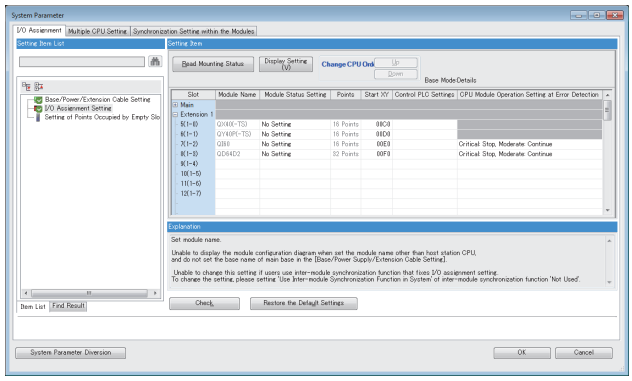
Windows in GX Works2 for the MELSEC-Q series changes the following windows in GX Works3.

Parameter items

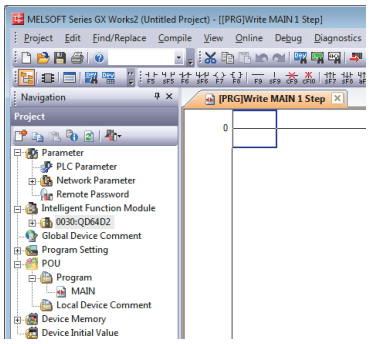
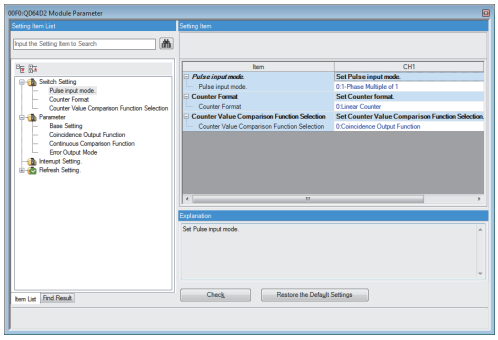
This section describes the window change of parameters. For parameter setting method on GX Works3, refer to the following.

📖 MELSEC iQ-R CPU Module User's Manual (Application)

- "Points", "Start XY", and "PLC Operation Mode at H/W Error" in "I/O Assignment" of GX Works2 change the following window in GX Works3.

GX Works2	GX Works3
Project window ⇨ [Parameter] ⇨ [PLC Parameter] ⇨ [I/O Assignment]	Navigation window ⇨ [Parameter] ⇨ [System Parameter] ⇨ [I/O Assignment Setting]
 	

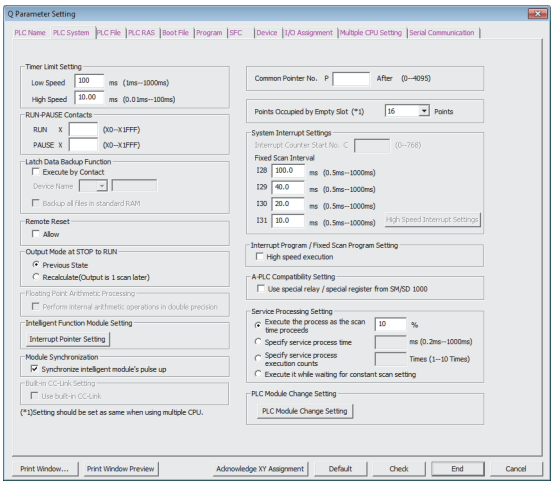
- "Switch Setting", "Error Time Output Mode", and "Intelligent Function Module Parameter" in "I/O Assignment" of GX Works2 change the following window in GX Works3.

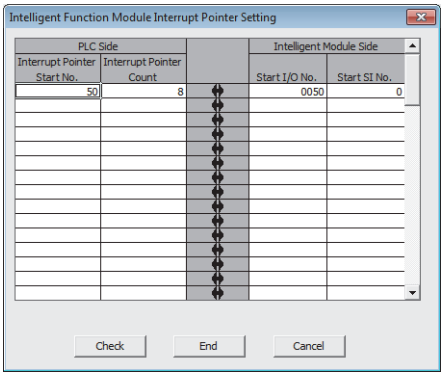
GX Works2	GX Works3
Project window ⇨ [Intelligent Function Module] ⇨ Module model name 	Navigation window ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Module Parameter] 

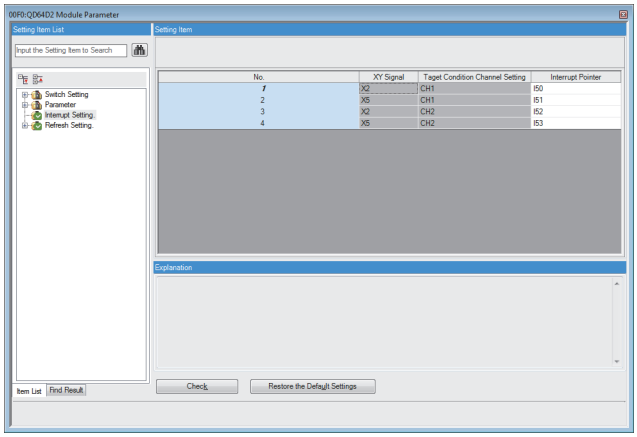
■Interrupt pointer setting

"Interrupt Pointer Setting" of GX Works2 changes the following window in GX Works3.

GX Works2	GX Works3
Project window ⇨ [Parameter] ⇨ [PLC Parameter] ⇨ [PLC System] ⇨ [Interrupt Pointer Setting]	Navigation window ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Module Parameter]





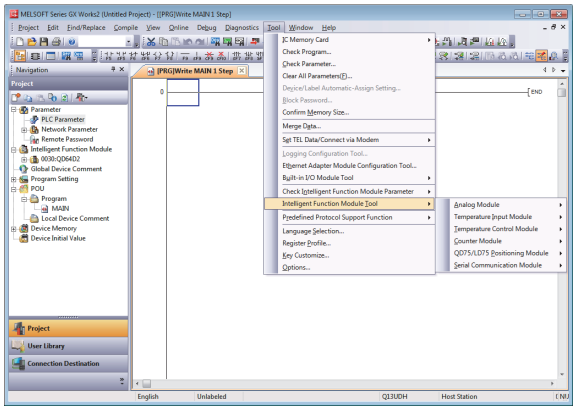
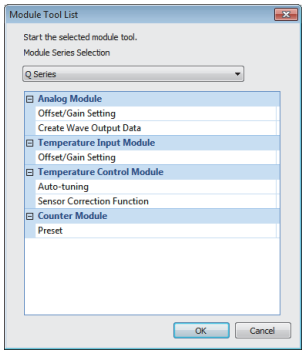


The interrupt pointer setting method differs as below between GX Works2 and GX Works3.

- The SI No. setting of the interrupt module is not required on GX Works3.
- "Interrupt pointer" of the interrupt module must be the serial number on GX Works3. (Set I51 on No.2 and I52 on No.3 when No.1 is set I50.)

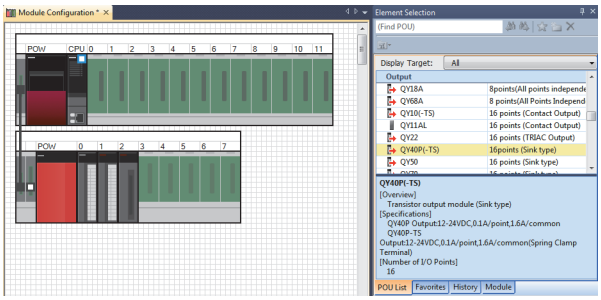
Intelligent function module tool

"Intelligent Function Module Tool" of GX Works2 changes the following window in GX Works3.

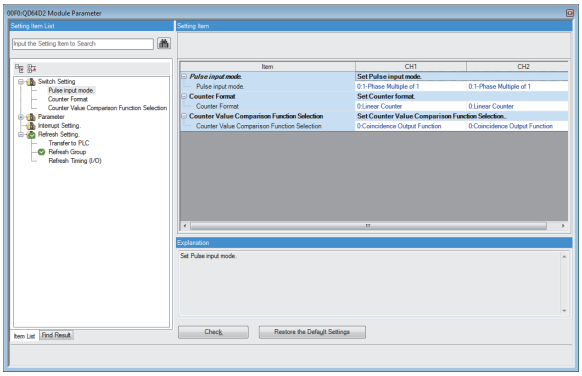
GX Works2	GX Works3
[Tool] ⇨ [Intelligent Function Module Tool] ⇨ Each module tool	[Tool] ⇨ [Module Tool List] ⇨ [Q Series] ⇨ Each module tool
	

Setting procedure

This section describes the setting procedure for the MELSEC-Q series module in GX Works3.



1. Create the module configuration in accordance with the actual configuration by dragging and dropping each MELSEC-Q series module from "Element Selection" window of "Module Configuration" in GX Works3. Then, select [Edit] ⇨ [Parameter] ⇨ [Fix].*1*2



2. Set the module parameters of each module.

Navigation window ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Module Parameter]

*1 When the CPU module used can be connected to GX Works3, the actual system configuration can be read out by selecting [Online] ⇨ [Read Module Configuration from PLC] in the menu. For the modules which cannot be read out, create the module configuration by dragging and dropping each module from "Element Selection" window.

*2 When "Points", "Start XY", or "CPU Module Operation Setting at Error Detection" are changed, set the parameters in "System Parameter". (☞ Page 102 Parameter items)

Product classification in "Module Configuration"

The models are classified into the following.

Model	Product classification in "Module Configuration"	Remarks
Q52B, Q55B, Q63B, Q65B, Q68B, Q612B, Q55BL*1, Q65BL*1, Q68BL*1, Q55BLS*2, Q65BLS*2, Q68BLS*2, Q55BLS-D*2, Q65BLS-D*2, Q68BLS-D*2	Extension Base	-
QC05B, QC06B, QC12B, QC30B, QC50B, QC100B	Bus Cable*3	-
Q61P, Q61P-A1, Q61P-A2, Q62P, Q63P, Q64P, Q64PN, Q61P-D	Power Supply	-
QX10, QX10-TS, QX28, QX40, QX40-TS, QX40-S1, QX41, QX41-S1, QX41-S2, QX42, QX42-S1, QX70, QX71, QX72, QX80, QX80-TS, QX81, QX81-S2, QX82, QX82-S1, QX40H, QX70H, QX80H, QX90H, QX50, QX11L*4, QX21L*4	Input	-
QY10, QY10-TS, QY18A, QY22, QY40P, QY40P-TS, QY41P, QY42P, QY50, QY68A, QY70, QY71, QY80, QY80-TS, QY81P, QY82P, QY41H, QY11AL*5, QY13L*5, QY23L*5, QY51PL*5	Output	-
QH42P, QX48Y57, QX41Y41P	I/O	-
QI60	Interrupt Input	-
Q61LD, Q62AD-DGH, Q64AD, Q68ADV, Q68ADI, Q64AD-GH, Q64ADH, Q66AD-DG, Q68AD-G, Q68CT	Analog Input	Analog-digital converter modules and current transformer input modules are classified into this category.
Q62DA, Q62DAN, Q64DA, Q64DAN, Q68DAV, Q68DAVN, Q68DAI, Q68DAIN, Q62DA-FG, Q66DA-G, Q64DAH	Analog Output	Digital-analog converter modules are classified into into this category.
Q64AD2DA	Analog I/O	-
Q64RD, Q64RD-G, Q68RD3-G, Q64TD, Q64TDV-GH, Q68TD-G-H01, Q68TD-G-H02	Temperature Input	-
Q64TCTTN, Q64TCRTN, Q64TCTTBWN, Q64TCRTBWN	Temperature Control Module	-
Q62HLC	Loop Control	-
QD70P4, QD70P8, QD70D4, QD70D8, QD73A1, QD64D2, QD65PD2, QD72P3C3, QD63P6, QD60P8-G	Pulse I/O/Positioning	Positioning modules, high-speed counter modules, and pulse input modules are classified into into this category.
QE81WH, QE84WH, QE81WH4W, QE83WH4W, QE82LG	Energy Measuring Module	-
QD51, QD51-R24, QJ71MES96, QJ71WS96	Information Module	MES interface modules and Web server modules are classified into into this category.
QJ51AW12AL, QJ61CL12, QJ71AS92, QJ71FL71, QJ71FL71-T, QJ71FL71-B2, QJ71FL71-B5, QJ71FL71-F01, QJ71FL71-T-F01, QJ71FL71-B2-F01, QJ71FL71-B5-F01, QJ71MB91, QJ71MT91	Network module	CC-Link/LT master modules and FL-net(OPCN-2) interface modules are classified into this category.
QG60	Blank cover	-

*1 Q series large type extension base unit
*2 Q series large type extension base unit (AnS series size)
*3 A model is not displayed on "Element Selection" window of "Module Configuration".
*4 Large type input module
*5 Large type output module

Refresh processing time

The refresh processing time [μs] is a constituent of the scan time of the CPU module. For details on the scan time, refer to the following.

📖 MELSEC iQ-R CPU Module User's Manual (Application)

The refresh processing time [μs], which is taken for refresh, is given by:

- Refresh processing time [μs] = Refresh read time (time for transferring refresh data to the CPU module) + Refresh write time (time for transferring refresh data to the intelligent function module)

The refresh read time and refresh write time vary depending on the settings of "Target".

When "Target" is a refresh data register (RD)

The following table shows the refresh read time and refresh write time with a MELSEC iQ-R series CPU module used.

Module	Model	RQ extension base unit		Q extension base unit	
		Read time	Write time	Read time	Write time
Analog-digital converter module	Q64AD	32.93μs	0μs	47.69μs	0μs
	Q68ADV, Q68ADI	35.97μs	0μs	54.97μs	0μs
Channel isolated high resolution analog-digital converter module	Q64AD-GH	45.80μs	0μs	77.91μs	0μs
channel isolated high resolution analog-digital converter module (with signal conditioning function)	Q62AD-DGH	41.24μs	0μs	66.99μs	0μs
Channel isolated analog-digital converter module	Q68AD-G	40.76μs	0μs	64.64μs	0μs
Channel isolated analog-digital converter module (with signal conditioning function)	Q66AD-DG	38.48μs	0μs	59.18μs	0μs
High speed analog-digital converter module	Q64ADH	58.32μs	39.08μs	103.09μs	65.02μs
Digital-analog converter module	Q62DA, Q62DAN	26.09μs	22.89μs	31.31μs	29.94μs
	Q64DA, Q64DAN	26.09μs	23.75μs	31.31μs	26.76μs
	Q68DAV, Q68DAVN, Q68DAI, Q68DAIN	26.09μs	25.47μs	31.31μs	30.40μs
Channel isolated digital-analog converter module	Q62DA-FG	35.92μs	22.89μs	54.25μs	24.94μs
	Q66DA-G	27.94μs	24.61μs	35.14μs	28.58μs
High speed digital-analog converter module	Q64DAH	29.79μs	23.75μs	38.97μs	26.76μs
Analog input/output module	Q64AD2DA	239.35μs	43.35μs	538.41μs	75.22μs
Load cell input module	Q61LD	59.10μs	0μs	109.76μs	0μs
Current transformer input module	Q68CT	153.34μs	58.12μs	335.44μs	100.66μs
RTD input module	Q64RD	33.64μs	0μs	48.79μs	0μs
Channel isolated RTD input module	Q64RD-G	34.02μs	0μs	49.70μs	0μs
	Q68RD3-G	40.91μs	0μs	19.71μs	0μs
Thermocouple input module	Q64TD	39.39μs	0μs	63.16μs	0μs
Channel isolated thermocouple/micro voltage input module	Q64TDV-GH	30.60μs	0μs	41.51μs	0μs
Channel isolated thermocouple input module	Q68TD-G-H01, Q68TD-G-H02	33.26μs	0μs	47.88μs	0μs
Temperature control module	Q64TCTTN, Q64TCRTN	323.58μs	50.91μs	743.12μs	98.20μs
	Q64TCTTBWN, Q64TCRTBWN	323.58μs	52.63μs	743.12μs	101.84μs
Loop control module	Q62HLC	49.02μs	32.26μs	83.22μs	48.26μs
Multichannel high-speed counter module	QD63P6	61.13μs	0μs	111.62μs	0μs
4Mpps capable high-speed counter module	QD64D2	37.62μs	0μs	55.92μs	0μs
Channel isolated pulse input module	QD60P8-G	108.96μs	0μs	225.56μs	0μs
Multi function counter/timer module	QD65PD2	159.83μs	0μs	346.78μs	0μs
Positioning modules	QD70P4, QD70D4	54.24μs	0μs	94.52μs	0μs
	QD70P8, QD70D8	87.28μs	0μs	168.84μs	0μs
	QD73A1	28.75μs	0μs	37.68μs	0μs
Positioning module with built-in counter function	QD72P3C3	35.87μs	0μs	53.53μs	0μs
AS-i master module	QJ71AS92	164.82μs	174.32μs	359.33μs	369.23μs

Module	Model	RQ extension base unit		Q extension base unit	
		Read time	Write time	Read time	Write time
AnyWireASLINK master module	QJ51AW12AL	28.75μs	23.51μs	37.68μs	31.72μs
Energy measuring module	QE81WH	83.93μs	0μs	166.22μs	0μs
	QE84WH	326.44μs	0μs	729.56μs	0μs
	QE81WH4W	91.48μs	0μs	183.70μs	0μs
	QE83WH4W	286.36μs	0μs	635.98μs	0μs
Insulation monitoring module	QE82LG	139.66μs	0μs	302.68μs	0μs

When "Target" is a specified device

Calculate the refresh read time and refresh write time according to the number of items and the number of their transfer data (word) that are set to be refreshed. For the calculation method, refer to the following.

MELSEC iQ-R CPU Module User's Manual (Application)

In addition, substitute the following values in the calculation formula to calculate the refresh read time.

Condition	Item	Description
RQ extension base unit	Number of refresh settings	The number of items that are set to be refreshed
	Refresh time (A) of each of the first to nth set items	0.38μs per one word of each of the first to nth set items*1
	Refresh time (B) of each of the first to nth set items	0.43μs per one word of each of the first to nth set items*1
Q extension base unit	Number of refresh settings	The number of items that are set to be refreshed
	Refresh time (A) of each of the first to nth set items	0.91μs per one word of each of the first to nth set items*1
	Refresh time (B) of each of the first to nth set items	0.97μs per one word of each of the first to nth set items*1

*1 This value is the time with a MELSEC iQ-R series CPU module used.

Ex.

If all the 5 items (5 words in total) are set in the refresh read settings of the Q64DAN mounted on the RQ extension base unit.

$5 \times 1.47 + 0.38 \times 5 + 21.2 = 30.45\mu s$

The refresh read time, therefore, is 30.45μs.

Ex.

If all the 4 items (4 words in total) are set in the refresh write settings of the Q64DAN mounted on the RQ extension base unit.

$4 \times 0.83 + 0.43 \times 4 + 15.8 = 20.84\mu s$

The refresh write time, therefore, is 20.84μs.

Precautions

This section describes precautions for using the following modules.
For details, refer to the manual for the module used.

I/O modules

■High-speed input modules

- When a high-speed input module is used as a high-speed input module, select the following model in "Module Configuration" in accordance with on or off of a noise filter. (The module operates with the default setting (input response time: 0.2ms) when on or off of the noise filter does not correspond to on or off of the model on "Module Configuration".)

Model	Model displayed on GX Works3	
	When the noise filter is turned on	When the noise filter is turned off
QX40H	QX40H(NoiseF_ON)	QX40H(NoiseF_OFF)
QX70H	QX70H(NoiseF_ON)	QX70H(NoiseF_OFF)
QX80H	QX80H(NoiseF_ON)	QX80H(NoiseF_OFF)
QX90H	QX90H(NoiseF_ON)	QX90H(NoiseF_OFF)

- When a high-speed input module is used as an interrupt module, select "QI60" in "Module Configuration". (The module operates with the default setting (input response time: 0.2ms) when the noise filter is used at off.)
- When high-speed input modules are used as interrupt modules, set the number of modules to be used in "I/O Assignment Setting" of "System Parameter".

■Interrupt modules

- When multiple interrupt modules are used, set the number of modules to be used in "I/O Assignment Setting" of "System Parameter".

High-speed counter modules and pulse input modules

Check the latest error code with the system monitor because error codes for the QD63P6 and QD60P8-G cannot be checked in the module diagnostics. When multiple errors occur, refer to the buffer memory and check the error.

Positioning modules

- Set parameters in a program because the positioning data parameter cannot be written to the module. The positioning data parameter is discarded when the GX Works2 project is read out.
- Check the latest error code with the system monitor because error codes for the QD70P4, QD70P8, QD70D4, and QD70D8 cannot be checked in the module diagnostics. When multiple errors occur, refer to the buffer memory (error codes for each axis) and check the error.

Loop control module

Check the latest error code with the system monitor because error codes for the Q62HLC cannot be checked in the module diagnostics. When multiple errors occur, refer to the buffer memory and check the error.

FL-net(OPCN-2) interface module

- Select the following model displayed on "Module Configuration". The model is also displayed on the diagnostic window.

Model	Model displayed on GX Works3
QJ71FL71	QJ71FL71(-T -B5)(-F01)
QJ71FL71-F01	
QJ71FL71-B5	
QJ71FL71-B5-F01	
QJ71FL71-T	
QJ71FL71-T-F01	
QJ71FL71-B2	QJ71FL71-B2(-F01)
QJ71FL71-B2-F01	

- Select "Online" in "Operation Mode Setting" of "Switch Setting".
- Set parameters in a program because the auto refresh used in GX Works2 cannot be set in GX Works3.
- In GX Works2, the size of region 1 of cyclic data is set in units of bits, while in GX Works3, it is set in units of words.

MODBUS® interface module and MODBUS®/TCP interface module

- When "Start MODBUS device number" of "MODBUS device assignment parameter" is set, check the setting range in the manual in advance.
- For "Basic parameter starting method" and "MODBUS® device assignment parameter starting method" of "Switch setting" in "Basic setting", only "Start by user setting parameter" can be selected. Write a program to set the automatic communication parameters as well as module parameters set only "Switch Setting" when the default assignment parameter is used as the staring method.
- GX Works3 does not support "Setting for GX Works2 Connection" of GX Works2.
- The Z(P).MBRW and Z(P).MBREQ instructions cannot be used. Instead of these instructions, use the automatic communication function.
- Set parameters in a program because the auto refresh used in GX Works2 cannot be set in GX Works3.

AnyWireASLINK master module and AnyWire DB A20 master module

- Set a slave module by using the address writer because GX Works3 does not support "AnyWireASLINK Configuration" of GX Works2.
- The auto-generation of a global label (CSV file output from the device assignment window) cannot be use.
- When the AnyWire DB A20 master module is used, select the following model displayed on "Module Configuration". The model is also displayed on the diagnostic window.

Model	Model displayed on GX Works3
QJ51AW12D2	MELSEC_Partner

MES interface module and Web server module

Use the module corresponding to the MELSEC iQ-R series. For the availability, check the serial number of a module.

Intelligent communication module

- The SW1VD-AD51HP software package can be used as well as the MELSEC-Q series.
- When the PCRD instruction of the BASIC program is used, there are restrictions on the following processing codes. The codes other than the following can be used as well as when using the MELSEC-Q series CPU module.

Processing code	Restriction
513 (&H201)	Not available
515 (&H203)	The device range of a MELSEC-Q series CPU module only can be used.
516 (&H204)	
533 (&H215)	The buffer memory of a MELSEC iQ-R series module cannot be read out.

- When the PCWT instruction of the BASIC program is used, there are restrictions on the following processing codes. The codes other than the following can be used as well as when using the MELSEC-Q series CPU module.

Processing code	Restriction
515 (&H203)	The device range of a MELSEC-Q series CPU module only can be used.
516 (&H204)	
533 (&H215)	Data cannot be written to the buffer memory of a MELSEC iQ-R series module.

Q series large type extension base unit (AnS series size)

Select the module which can be used to each extension base unit on "Module Configuration". When the Q series large type blank cover is used, select the module with the Q series large type blank cover.

Appendix 4 EMC and Low Voltage Directives

Compliance with the EMC Directive, which is one of the EU directives, has been mandatory for products sold within EU member states since 1996 as well as compliance with the Low Voltage Directive since 1997.
For products compliant to the EMC and Low Voltage Directives, their manufacturers are required to declare compliance and affix the CE marking.
The sales representative in EU member states is:
Company: Mitsubishi Electric Europe BV
Address: Gothaer Strasse 8, 40880 Ratingen, Germany

Measures to comply with the EMC Directive

The EMC Directive sets requirements for emission (conducted and radiated electromagnetic interference emitted by a product) and immunity (the ability of a product not to be influenced by externally generated electromagnetic interference).
This section describes the precautions for machinery constructed with the MELSEC iQ-R series modules to comply with the EMC Directive.
These precautions are based on the requirements of the EMC Directive and the harmonized standards. However, they do not guarantee that the entire machinery constructed according to the descriptions complies with the EMC Directive.
The manufacturer of the machinery must determine the testing method for compliance and declare conformity to the EMC Directive.

EMC Directive related standards

■Emission requirements

Standard: EN61131-2:2007

Test item	Test description	Value specified in standard
CISPR16-2-3 Radiated emission*2	The electromagnetic wave emitted by the product to the external space is measured.	• 30 to 230MHzQP: 40dBμV/m (measured at 10m distance)*1 • 230 to 1000MHzQP: 47dBμV/m (measured at 10m distance)
CISPR16-2-1, CISPR16-1-2 Conducted emission*2	The noise level which the product emits to the power line is measured.	• 0.15 to 0.5MHzQP: 79dB, Mean: 66dB*1 • 0.5 to 30MHzQP: 73dB, Mean: 60dB

*1 QP: Quasi-Peak value, Mean: Average value

*2 Programmable controller is an open-type device intended to be placed in a conductive control panel or similar type of enclosure. The tests were conducted with the programmable controller installed in a control panel, applying the maximum rated input voltage of the power supply module.

■Immunity requirements

Standard: EN61131-2:2007

Test item	Test description	Value specified in standard
EN61000-4-2 Electrostatic discharge immunity*1	An electrostatic discharge is applied to the enclosure of the equipment.	• 8kV: Air discharge • 4kV: Contact discharge
EN61000-4-3 Radiated, radio-frequency, electromagnetic field immunity*1	An electric field is radiated to the product.	80% AM modulation @1kHz • 80 to 1000MHz: 10Vm • 1.4 to 2.0GHz: 3Vm • 2.0 to 2.7GHz: 1Vm
EN61000-4-4 Fast transient burst immunity*1	Burst noise is applied to power lines and signal lines.	• AC/DC power, I/O power, and AC I/O (unshielded) lines: 2kV • DC I/O, analog, and communication lines: 1kV
EN61000-4-5 Surge immunity*1	Lightning surge is applied to power lines and signal lines.	• AC power, AC I/O power, and AC I/O (unshielded) lines: 2kV CM, 1kV DM • DC power and DC I/O power lines: 0.5kV CM, 0.5kV DM • DC I/O, AC I/O (shielded), analog*2, and communication lines: 1kV CM
EN61000-4-6 Conducted RF immunity*1	High-frequency noise is applied to power lines and signal lines.	0.15 to 80MHz, 80% AM modulation @1kHz, 10Vrms
EN61000-4-8 Power-frequency magnetic field immunity*1	The product is immersed in the magnetic field of an induction coil.	50/60Hz, 30A/m
EN61000-4-11 Voltage dips and interruption immunity*1	Power voltage is momentarily interrupted.	• 0%, 0.5 period, starting at zerocrossing • 0%, 250/300 period (50/60Hz) • 40%, 10/12 period (50/60Hz) • 70%, 25/30 period (50/60Hz)

*1 Programmable controller is an open-type device intended to be placed in a conductive control panel or similar type of enclosure. The tests were conducted with the programmable controller installed in a control panel.

*2 The accuracy of an analog-digital converter module may temporarily vary within ±10%.

Installation in a control panel

Programmable controller is an open-type device intended to be placed in a conductive control panel or similar type of enclosure.

Remote modules on each network must be also installed inside the control panel. Waterproof type remote modules can be installed outside the control panel.

This ensures safety as well as effective shielding of electromagnetic noise emitted from the programmable controller.

■Control panel

- Use a conductive control panel.
- Mask off an area used for grounding in advance.
- To ensure electrical contact between inner plates and the control panel, mask off the bolt installation areas of each inner plate so that conductivity can be ensured in the largest area.
- Ground the control panel with a thick ground cable so that low impedance can be ensured even at high frequencies.
- Keep the diameter of the holes on the control panel to 10cm or less. If the diameter is larger than 10cm, electromagnetic wave may leak. In addition, because electromagnetic wave leaks through a clearance between the control panel and its door, reduce the clearance as much as possible. Use of EMI gaskets (sealing the clearance) can suppress undesired radiated emissions.

The tests were conducted by Mitsubishi Electric Corporation using a control panel having damping characteristics of 37dB (maximum) and 30dB (average) (measured at 3m distance, 30 to 300MHz).

■Power cable and ground cable

- Provide a ground point to the control panel near the power supply module. Ground the LG and FG terminals of the power supply module to the ground point with the thickest and shortest ground cable possible (2㎟ or less, a length of 30cm or shorter).
- Twist the ground cable extended from the ground point with the power cable so that larger amount of noise generated from the power cable is absorbed to the ground. Note that if a noise filter is attached to the power cable, twisting may not be required.

■DIN rails

Aluminum DIN rails may have insulation films. If an electrical contact cannot be secured between a DIN rail and a programmable controller, take measures to obtain conductivity.

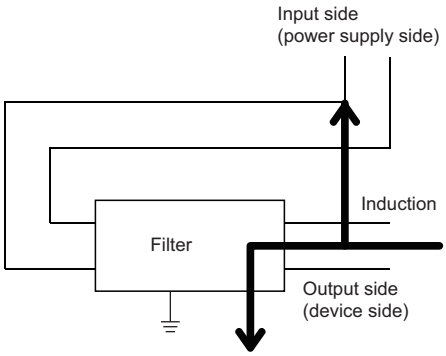
- Screw the programmable controller to the control panel directly, without using a DIN rail.
- Use iron DIN rails, such as TH35-7.5Fe and TH35-15Fe.

■Noise filter (power supply line filter)

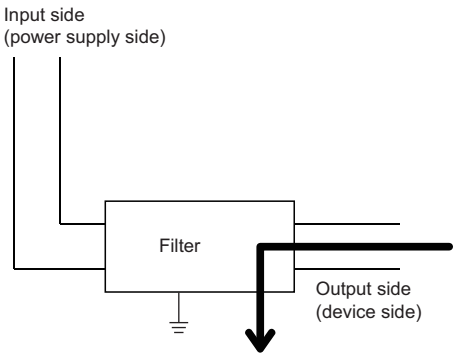
A noise filter is effective for reducing conducted noise in the 10MHz or less frequency band. (Use of a noise filter can suppress noise.)

The following are the installation precautions.

- Do not bundle the cables on the input side and output side of the noise filter. If bundled, the noise on the output side is induced into the filtered cable on the input side.



• Problematic example
Noise is induced when the input and output cables are bundled.

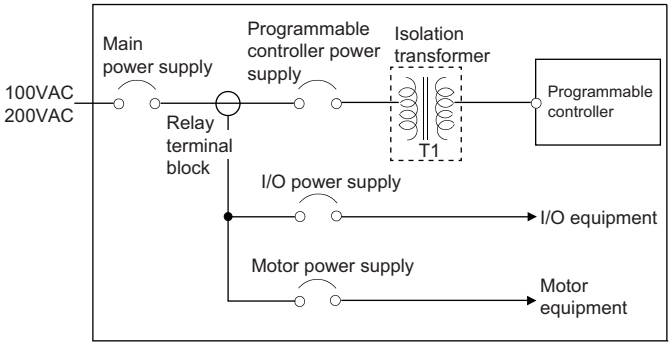


• Modification example
Install the input and output cables separately.

- Ground the ground terminal of the noise filter to the ground point of the control panel with the shortest cable possible (approximately 10cm).

■Isolation transformer

An Isolation transformer is effective for reducing conducted noise (especially, lightning surge). Lightning surge may cause malfunction of the programmable controller. As measures against lightning surge, connect an isolation transformer as shown below. Use of an isolation transformer can reduce a lightning effect.



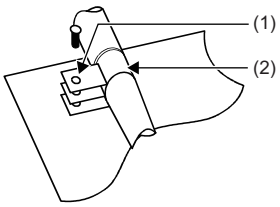
Cables extended out of the control panel

Use a shielded cable for a cable extended out of the control panel such as an I/O signal line (including a common line) and cable for communications.

If a shielded cable is not used or not grounded properly, the noise immunity will not meet the requirement.

■Grounding a shielded cable

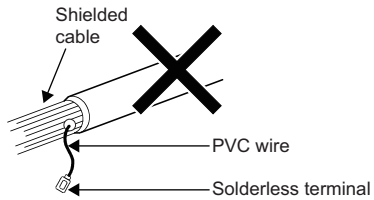
- Ground the shield of a shielded cable as close to the module as possible so that the grounded cable will not be affected by electromagnetic induction from ungrounded cables.
- Ground the exposed shield to a large area on the control panel. A clamp can be used as shown below. In this case, mask off the inner wall surface of the control panel, which comes in contact with the clamp.



(1) Paint mask
(2) Clamp

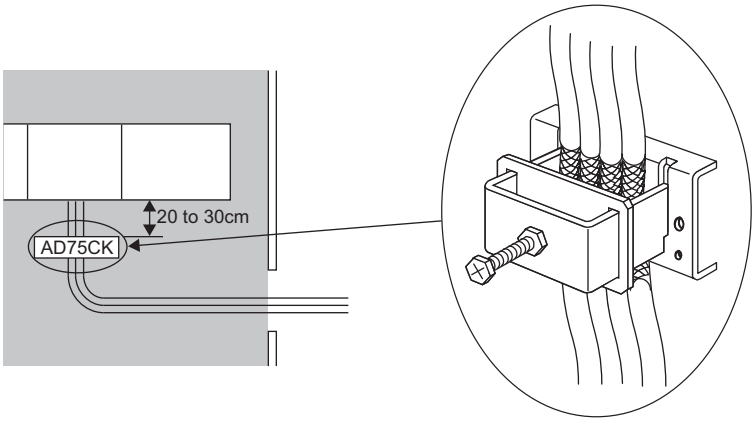
Point

Do not use the tip of a PVC wire soldered onto a shield of the shielded cable for grounding. Doing so will raise the high-frequency impedance, resulting in loss of the shielding effect.



■Grounding cables with a cable clamp

Use shielded cables for external wiring and ground the shields of the shielded cables to the control panel with an AD75CK cable clamp (manufactured by Mitsubishi). Ground the shields within 20 to 30cm from the module.



For details on the AD75CK, refer to the following.

AD75CK-type Cable Clamping Instruction Manual

■Ferrite core

A ferrite core is effective for reducing radiated noise in the 30MHz to 100MHz frequency band.

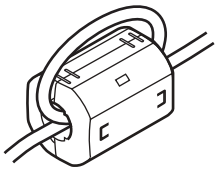
It is recommended to install a ferrite core if a shield cable extended out of the control panel does not provide sufficient shielding effects.

Install a ferrite core to the cable in the position just before the cable is extended out of the control panel. If the installation position is not appropriate, the ferrite core will not produce any effect.

Install a ferrite core to each power cable as shown below.

• (Ferrite core used for the tests conducted by Mitsubishi: ESD-SR-250 manufactured by NEC TOKIN Corporation)

Ex.

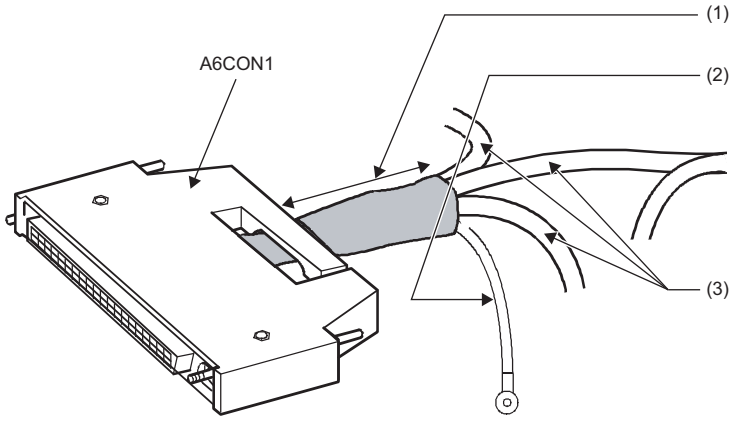


Connectors for external devices

When a module that requires a connector for external devices is used, take the following noise reduction measures.

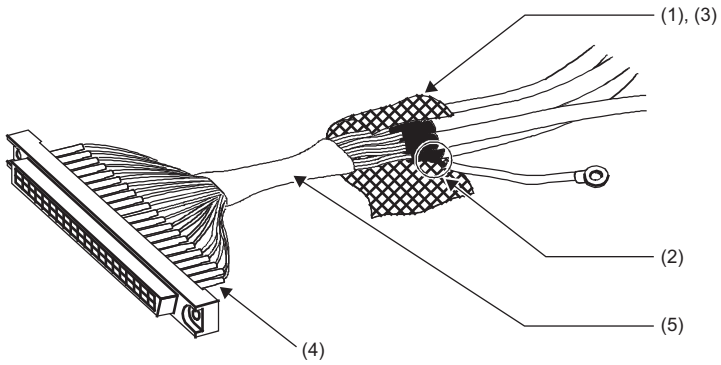
• When shielded cables are connected

The following figure shows an example of wiring against noise when a connector (A6CON1) is used.



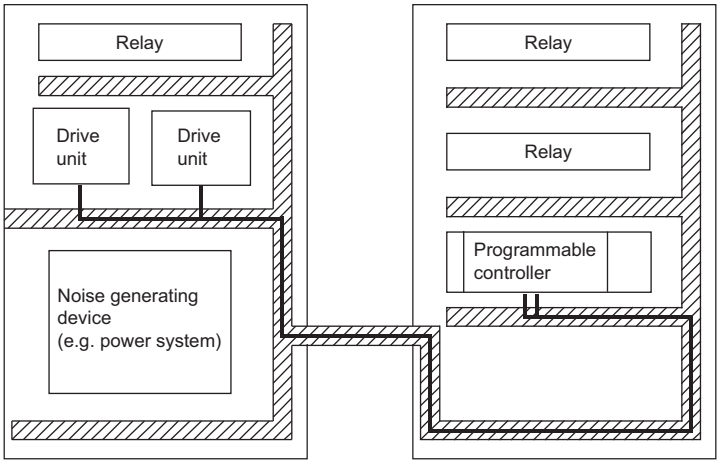
(1) The length between the connector and the shielded cables should be the shortest possible.
(2) Ground the FG wire of 2㎟ or more as short as possible. Ground it to the control panel on the module side.
(3) Shielded cable

• When shielded cables are processed

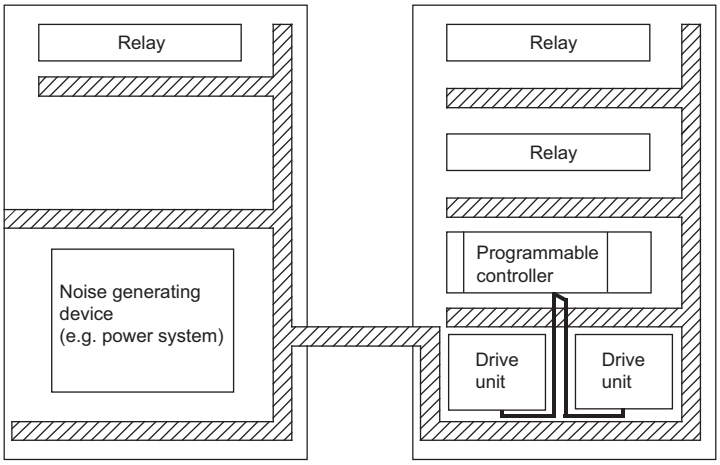


(1) Strip the jacket of each shield of the cables.
(2) Solder the shield of any shielded cable to the FG wire.
(3) Bundle the shields with conductive tape.
(4)To protect the wires, cover the connector pins with heat shrinkable insulating tubes. Exposed wires may cause malfunction of the module due to static electricity.
(5) Cover the conductive part with insulating tape.

• When a duct is used (problematic example and modification example)



• Problematic example
The drive units are placed near the noise source. The connection cables between the programmable controller and drive units are too long.



• Modification example
The programmable controller and drive units are placed closely. The connected cables between them are placed separately from the power line and the shortest. (In this example, the cables are connected without using the duct.)

Shaded part: Wiring duct

External power supply

Use a reinforced or double insulated CE-marked external power supply, and ground the FG terminal. Ground the FG terminals.

• External power supply used for the tests conducted by Mitsubishi: PS5R-SF24 manufactured by IDEC Corporation

Each module

■Power supply modules

- Ground the LG and FG terminals after short-circuiting them.
- Use a power cable of 30m or shorter when connecting it to the module power supply terminal.

■CPU module

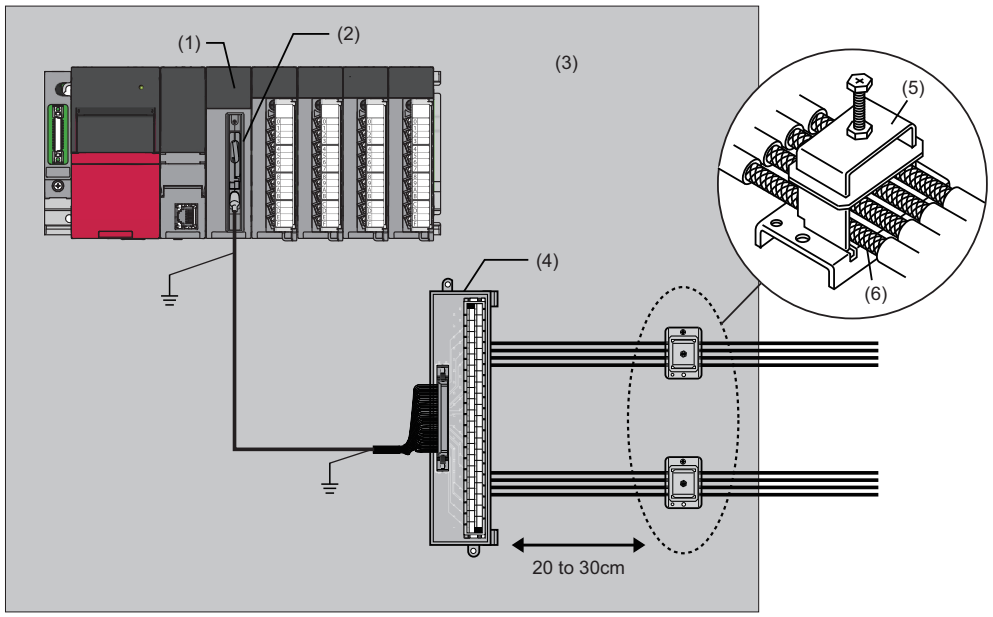
When inserted into a compatible module, the SD memory card (NZ1MEM-□GBSD) manufactured by Mitsubishi already conforms to IEC 61131-2.

■I/O modules

- Install a DC power supply and an I/O module inside the same control panel.
- Keep each DC power cable length to 30m or less.
- Take a surge protective measure, such as installing a surge suppressor, if the relay switches five times or more per minute.

■Channel isolated analog-digital converter modules, channel isolated digital-analog converter modules, channel isolated thermocouple input modules, and channel isolated RTD input modules

Making a relevant module comply with the EMC and Low Voltage Directives requires the wiring as shown below:



(1) Relevant module
(2) Connector for external devices
(3) Inside a control panel
(4) Relay terminal block
(5) AD75CK
(6) Strip off the jacket.

- The AD75CK cable clamp (manufactured by Mitsubishi) allows up to four cables to be grounded together if the outside diameter is approximately Φ7mm.
- For the wiring between the connector for external devices and the relay terminal block, use a shielded cable and ground it to the control panel. In addition, the wire length should be 3m or less.

■High-speed counter modules

- Install a DC power supply and a high-speed counter module inside the same control panel.
- Keep each DC power cable length to 30m or less.
- Keep the length of cables connected to external devices to 30m or less.

■Positioning modules

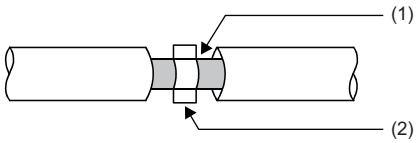
- Install a DC power supply and a Simple Motion module inside the same control panel.
- Keep the length of a cable between the RD75 and a drive unit as follows.
  - RD75P□: 2m or less
  - RD75D□: 10m or less
- Keep the length of cables connected to external devices to 30m or less except the pulse output.
- Keep each DC power cable length to 30m or less.

■Simple Motion modules

- Install a DC power supply and a Simple Motion module inside the same control panel.
- Keep the length of cables connected to external devices to 30m or less (10m or less for open collector output type).
- In wiring inside the panel, the power line connected to the power or servo amplifier and the communication cable such as an expansion cable or a network cable must not be mixed. In the duct, leave 10cm (3.94inch) or more between the power line and the communication cable, and separate using a separator (made of metal), etc. It is required in the same control panel as well.
- Mixing the power line and communication cable may cause increase of noise or malfunction due to noise influence.

■Ethernet-equipped modules

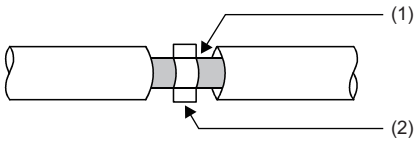
- Use a shielded twisted pair cable for connection to the 10BASE-T, 100BASE-TX, or 1000BASE-T connector. Strip a part of the jacket of the shielded twisted pair cable as shown below and ground the exposed shield to the largest area.



(1) Shield
(2) Clamp

■CC-Link IE Field Network-equipped master/local modules and Ethernet interface modules with built-in CC-Link IE (when the CC-Link IE function is used)

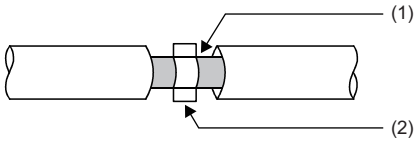
- Use an Ethernet cable recommended by CC-Link Partner Association.
- Ethernet cable is a shielded cable. Strip a part of the jacket as shown below and ground the exposed shield to the largest area.



(1) Shield
(2) Clamp

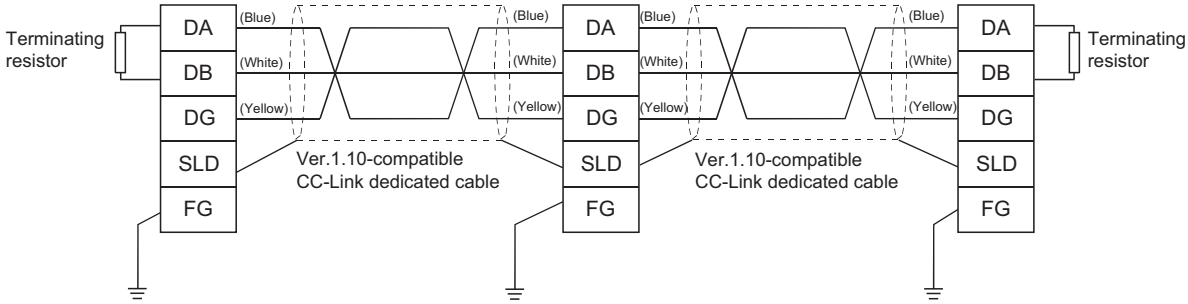
■CC-Link modules

- Ground the shield of a cable connected to the CC-Link module or any of the CC-Link stations which is the farthest from the input power inside the control panel within 30cm from the module or station.
- Ver.1.10-compatible CC-Link dedicated cable is a shielded cable Strip a part of the jacket of the cable as shown below and ground the exposed shield to the largest area.



(1) Shield
(2) Clamp

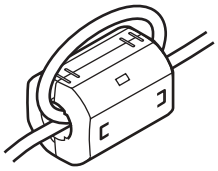
- Use the specified Ver.1.10-compatible CC-Link dedicated cable.
- Use the FG terminals of the CC-Link module and CC-Link stations as shown below to connect to the FG line inside the control panel.



- Use a CE-marked power supply to which the module power supply or external power supply is connected. Ground the FG terminals.
- Keep each power cable connected to the external power supply terminal or module power supply terminal to 30m or less.
- Connect a noise filter to the external power supply Use a noise filter with the damping characteristic, MA1206 (manufactured by TDK-Lambda Corporation) or equivalent. Note that a noise filter is not required if the module is used in Zone A defined in EN61131-2.

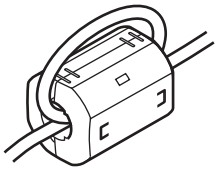
Manufacturer	Contact
TDK-Lambda Corporation	www.tdk-lambda.com

- Keep the length of signal cables connected to the analog input terminals of the AJ65BT-64RD3, AJ65BT-64RD4, and AJ65BT-68TD to 30m or less. Wire cables connected to the external power supply and module power supply terminal in the control panel where the module is installed.
- For the cable connected to the power supply terminal or the AJ65SBT-RPS, AJ65SBT-RPG, or AJ65BT-68TD, install a ferrite core with the damping characteristics, ZCAT3035-1330 (manufactured by TDK Corporation) or equivalent. Wrap the cable around the ferrite core by one as shown below.



Manufacturer	Contact
TDK Corporation	www.global.tdk.com

- To supply the module power supply terminal of the AJ65BTB2-16R/16DR, or AJ65SBTB2N-8A/8R/8S/16A/16R/16S with power using the AC/DC power supply, follow as shown below.
  - Install the AC/DC power supply in the control panel where the module is installed.
  - Use a reinforced or double insulated CE-marked AC/DC power supply, and ground the FG terminal. (AC/DC power supply used for the tests conducted by Mitsubishi: DLP-120-24-1 (manufactured by TDK-Lambda Corporation))
  - For the cable connected to the AC input terminal and DC output terminals of the AC/DC power supply, attach a ferrite core. Wrap the cable around the ferrite core by one as shown below. (Ferrite core used for the tests conducted by Mitsubishi: ESD-SR-250 (manufactured by NEC TOKIN Corporation))



Measures to comply with the Low Voltage Directive

The Low Voltage Directive requires electrical equipment that is designed or adapted for use between 50 to 1000VAC or 75 to 1500VDC to satisfy the safety requirements.
This section describes the precautions for use of the MELSEC iQ-R series modules to comply with the Low Voltage Directive. These precautions are based on the requirements of the Low Voltage Directive and the harmonized standards. However, they do not guarantee that the entire machinery constructed according to the descriptions complies with the Low Voltage Directive. The manufacturer of the machinery must determine the testing method for compliance and declare conformity to the Low Voltage Directive.

Standard applied to MELSEC iQ-R series modules

- EN61131-2 "Safety requirements for electrical equipment for measurement, control and laboratory use"

The MELSEC iQ-R series modules that operate at 50VAC/75VDC or higher rated input voltage have also been developed in accordance with EN61131-2.
However, the modules which operate at less than 50VAC/75VDC rated input voltage are not targeted for the Low Voltage Directive compliance.

MELSEC iQ-R series products to comply with the Low Voltage Directive

■Power supply modules

Power supply modules for the AC power supply which operate at 100VAC or 200VAC rated input voltage have hazardous voltage (peak voltage higher than or equal to 42.4V) internally. Therefore, insulation between the primary and secondary circuits is reinforced for CE-marked power supply modules.

■I/O modules

I/O modules which operate at 100VAC or 200VAC rated input voltage have hazardous voltage (peak voltage higher than or equal to 42.4V) internally. Therefore, insulation between the primary and secondary circuits is reinforced for CE-marked I/O modules.
I/O modules which operate at 24VDC or less rated input voltage are not targeted for the Low Voltage Directive compliance.

■CPU modules, SD memory cards, base units, intelligent function modules, and extended SRAM cassettes

These products are not targeted for the Low Voltage Directive compliance because the circuits in the products operate at the 24VDC or less rated voltage.

Power supply

Power supply modules are designed to meet the overvoltage category Ⅱ. Confirm that the power supply to a programmable controller meets the overvoltage category Ⅱ.

Control panel

■Protection against electric shock

Handle the control panel as follows to protect a person who does not have adequate knowledge of electrical installation from an electric shock.

- Lock the control panel so that only a person who is trained and has acquired enough knowledge of electrical installation can open the panel.
- Design the control panel so that the power supply is automatically shut off when the panel is opened.
- Use a control panel with a protection degree of IP20 or higher.

■Protection from dust and water

The control panel needs to be dustproof and waterproof.
Insufficient dustproof and waterproof lower the dielectric withstand of the control panel, possibly causing dielectric breakdown. The insulation of Mitsubishi programmable controllers is designed to be used in an environment of pollution degree 2. Use them in an environment of pollution degree 2 or below. The environment of pollution degree 2 can be achieved when the programmable controller is installed inside the control panel with a protection degree of IP54 or equivalent.

External Wiring

■24VDC external power supply

For 24VDC I/O modules or intelligent function modules requiring an external power supply, connect an external power supply of which insulation between the 24VDC circuit section and the hazardous voltage circuit section is reinforced.

■External devices

For external devices connected to a programmable controller, use the one of which insulation between the interface circuit section to the programmable controller and the hazardous voltage circuit section is reinforced (if the device internally has a hazardous voltage circuit section).

■Reinforced insulation

Reinforced insulation means an insulation having the following withstand voltage.

Rated voltage of hazardous voltage	Surge withstand voltage (1.2/50μs)
150VAC or less	2500V
300VAC or less	4000V

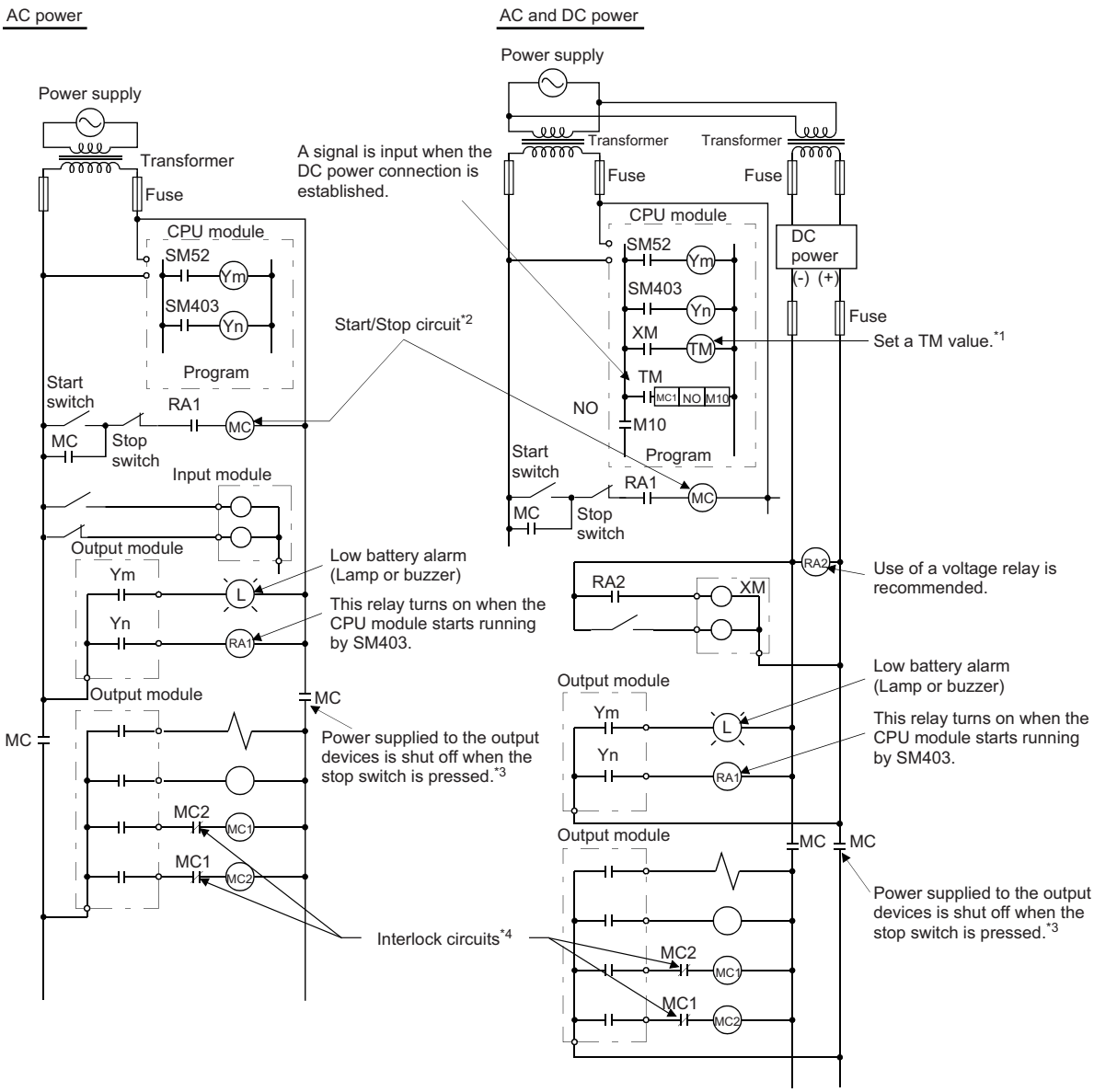
(Overvoltage category Ⅱ, source: IEC 664)

Appendix 5 General Safety Requirements

When a programmable controller is powered on or off, the control module may not output signals correctly for a moment due to differences in the delay and startup times between the power supply for the programmable controller and the external power supply (especially, DC power) for the control module.
Signals also may not be output correctly when the external power supply or the programmable controller fails.
In terms of fail-safe and to prevent any incorrect output signals from leading to the entire system failure, configure safety circuits (such as emergency stop circuits, protection circuits, and interlock circuits) external to the programmable controller for the parts where the incorrect output may cause damage to the machines or accidents.
This section shows system design circuit examples, considering the points described above.
When using the C Controller module, refer to the following.
MELSEC iQ-R C Controller Module User's Manual (Application)

System design circuit examples

When the ERR contact of the power supply module is not used



*1 Set a time required for DC power supply to be established.

*2 The programmable controller starts when RA1 (run monitor relay) turns on.

*3 The stop switch means an emergency stop switch or a limit switch.

*4 Configure external interlock circuits for conflicting operations such as forward/reverse rotations and the parts where the incorrect output may cause damage to the machines or accidents.

The power-on procedure is described below.

■For AC power

1. Power on the programmable controller.
2. Run the CPU module.
3. Turn on the start switch.
4. The output devices will be activated by the program when the relay, MC, turns on.

■For AC and DC power

1. Power on the programmable controller.
2. Run the CPU module.
3. The relay, RA2, turns on when AC power is converted to DC power.
4. The timer, TM, turns on when the DC power connection is fully established.

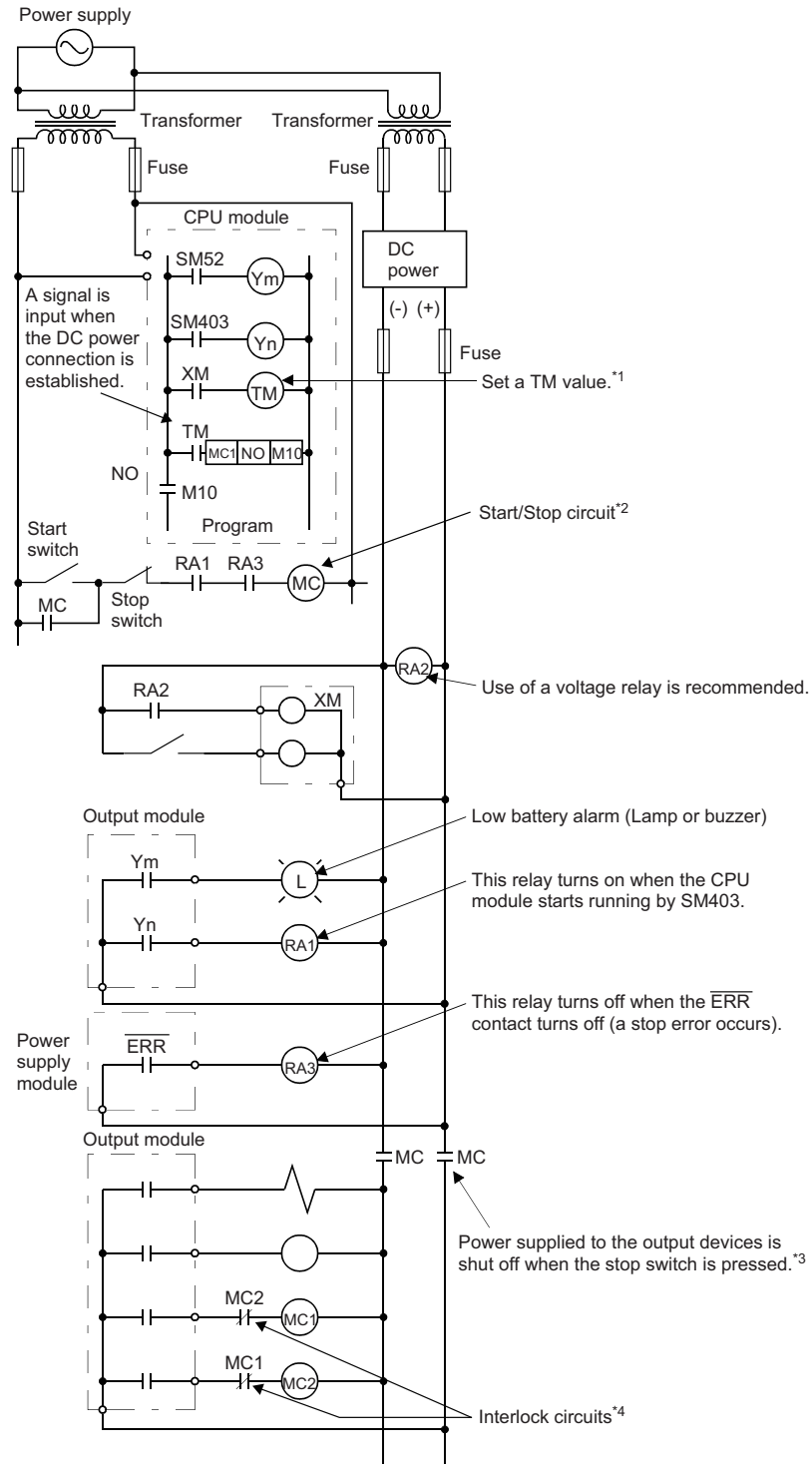
(The TM value shall be the time required from when RA2 turns on to when the DC power connection is fully established. Set this value to 0.5 seconds.)

5. Turn on the start switch.
6. The output devices will be activated by the program when the relay, MC, turns on.

(If a voltage relay is used for RA2, the timer, TM, is not required.)

When the $\overline{\text{ERR}}$ contact of the power supply module is used

AC and DC power



*1 Set a time required for DC power supply to be established.

*2 The programmable controller starts when RA1 (run monitor relay) turns on.

*3 The stop switch means an emergency stop switch or a limit switch.

*4 Configure external interlock circuits for conflicting operations such as forward/reverse rotations and the parts where the incorrect output may cause damage to the machines or accidents.

The power-on procedure is described below.

■For AC and DC power

1. Power on the programmable controller.

2. Run the CPU module.

3. The relay, RA2, turns on when AC power is converted to DC power.

4. The timer, TM, turns on when the DC power connection is fully established.

(The TM value shall be the time required from when RA2 turns on to when the DC power connection is fully established. Set this value to 0.5 seconds.)

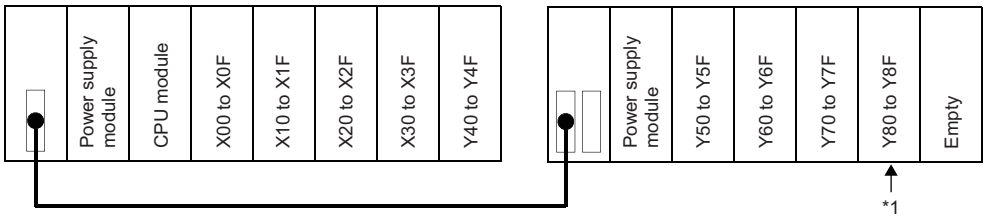
5. Turn on the start switch.

6. The output devices will be activated by the program when the relay, MC, turns on.

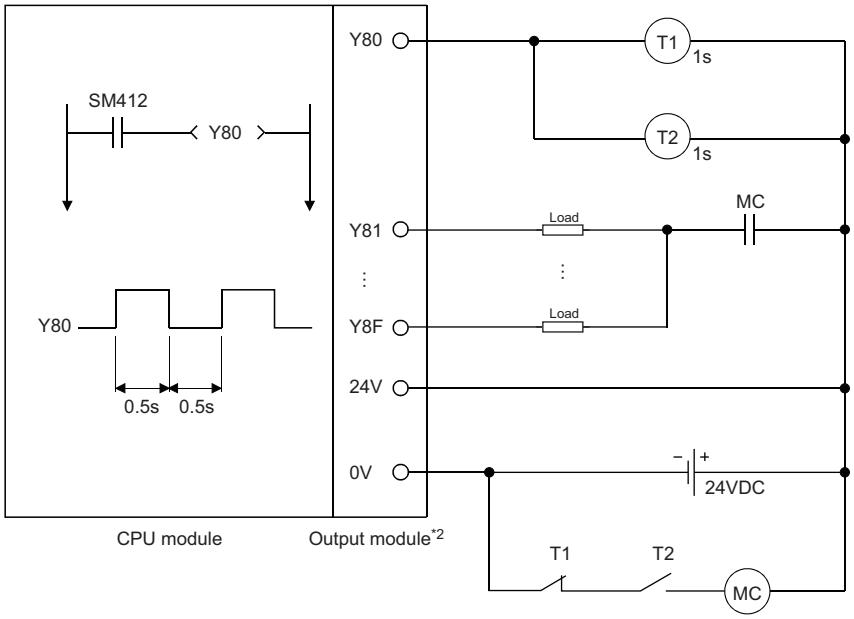
(If a voltage relay is used for RA2, the timer, TM, is not required.)

Fail-safe measures for CPU module failure

A CPU module can detect hardware failures of the CPU module itself and of its memory by the self-diagnostic function. However, failures which occur in a part, such as an I/O control part, may not be detected.
In this case, depending on the failure, all input or output points may turn on or off, or normal operation and safety of the control-target device may not be ensured.
Even though Mitsubishi programmable controllers are manufactured under strict quality control, they may fail due to some reasons. Provide fail-safe circuits external to the programmable controller so that no machine is damaged and no accident occurs.
A system example and its fail-safe circuit example are shown below.



*1 Mount an output module for fail-safe purpose in the last slot of the system. In the example above, Y80 to Y8F are assigned to the output module.



*2 Since Y80 turns on and off at 0.5 second intervals, use a contactless output module. (In the example above, a transistor output module is used.)

Appendix 6 Calculating Heating Value of Programmable Controller

The ambient temperature inside the control panel where a programmable controller is installed must be 55℃ or less.
It is necessary to know the average power consumption (heating value) of the equipment and devices installed inside the control panel when designing a heat release structure of the panel.
Calculate a rise in ambient temperature inside the control panel according to the following calculation formula.
The calculation formula for a rise in ambient temperature inside the control panel is as follows.

$$T = \frac{W}{UA} (^{\circ}C)$$

W: Average power consumption of the entire programmable controller system (☞ Page 132 Calculation formula for the average power consumption)
A: Surface area inside the control panel (㎡)
U: 6 when the ambient temperature inside the control panel is uniformed using a fan or 4 when the air inside the control panel is not circulated

Point

If the temperature inside the control panel is expected to exceed the specified range, it is recommended to install a heat exchanger to the panel to lower the temperature.
If a general-purpose fan is used, dust will be sucked into the control panel with the external air. This may affect the performance of the programmable controller.

Calculation formula for the average power consumption

The power power consumption of the programmable controller are roughly classified into six blocks: W_{PW}, W_{5V}, W_{24V}, W_{OUT}, W_{IN}, W_S The total of the power consumption calculated for each block is the power consumption of the entire programmable controller system.

$W = W_{PW} + W_{5V} + W_{24V} + W_{OUT} + W_{IN} + W_S(W)$

Calculate a heating value and a rise in ambient temperature inside the control panel according to the calculated power consumption (W).
For the calculation formula for each block, refer to the following.

- W_{PW} (☞ Page 133 Power consumption of a power supply module)
- W_{5V} (☞ Page 133 Total of the internal current consumption 5VDC of each module)
- W_{24V} (☞ Page 133 Total average power consumption 24VDC of output modules)
- W_{OUT} (☞ Page 133 Average power consumption due to a voltage drop of output modules)
- W_{IN} (☞ Page 133 Average power consumption at the input sections of input modules)
- W_S (☞ Page 133 Power consumption of the external power supply used for each module)

Point

The total current consumption of each module can be checked by the engineering tool.

Power consumption of a power supply module

The power conversion efficiency of a power supply module is approximately 70% and the remaining 30% is dissipated as heat, so that 3/7 of the output power will be the power consumption. Therefore, the power consumption of a power supply module, W_{PW}, is given by the following formula:

$$W_{PW} = \frac{3}{7} \times \{ (I_{5v} \times 5) + (I_{24v} \times 24) \} (W)$$

I_{5V}: Internal current consumption 5VDC of each module

I_{24V}: Average current consumption (current consumption for the number of simultaneous on points) of 24VDC power supply for the output module internal consumption

This does not apply to a case where a power supply module that does not have the 24VDC output is used and 24VDC is supplied from the outside.

Total of the internal current consumption 5VDC of each module

The power consumption of the 5VDC output in a power supply module is equal to the total power consumption of each module including the base unit and the CPU module.*1

The total of the internal current consumption 5VDC of each module, or W_{5V}, is given by the following formula:

$W_{5V} = I_{5V} \times 5(W)$

*1 For the power consumption of the Motion CPU, refer to the following.

Manual for the module used

Total average power consumption 24VDC of output modules

The average power consumption (power consumption for the number of simultaneous on points) of the 24VDC power supply for the output module internal consumption is equal to the total power consumption of each output module.

The total average power consumption 24VDC of output modules, or W_{24V}, is given by the following formula:

$W_{24V} = I_{24V} \times 24 \times$ Simultaneous on ratio (W)

Average power consumption due to a voltage drop of output modules

The average power consumption (power consumption for the number of simultaneous on points) due to a voltage drop at the output sections of output modules, or W_{OUT}, is given by the following formula:

$W_{OUT} = I_{OUT} \times V_{drop} \times$ Number of output points $\times$ Simultaneous on ratio (W)

I_{OUT}: Output current (current in actual use) (A)

V_{drop}: Voltage drop of each output module (V)

Average power consumption at the input sections of input modules

The average power consumption (power consumption for the number of simultaneous on points) at the input sections of input modules, or W_{IN}, is given by the following formula:

$W_{IN} = I_{IN} \times E \times$ Number of input points $\times$ Simultaneous on ratio (W)

I_{IN}: Input current (effective value for AC) (A)

E: Input voltage (voltage in actual use) (V)

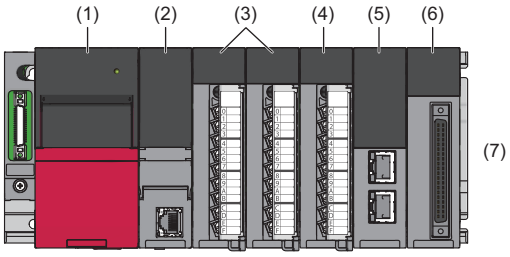
Power consumption of the external power supply used for each module

The power consumption of the external power supply section of each intelligent function module, or W_S, is given by the following formula:

$W_S = I_{24V} \times 24(W)$

Calculation examples for the average power consumption

System configuration



■5VDC/24VDC current consumption of each module

No.	Module	5VDC	24VDC
(1)	Power supply module	—	—
(2)	CPU module	0.69A	—
(3)	Input module	0.04A	—
(4)	Output module	0.052A	0.01A
(5)	Network module	0.6A	—
(6)	Intelligent function module	0.272A	0.192A
(7)	Base unit	0.22A	—

Power consumption of each block

■Power consumption of power supply module

$W_{PW} = 3/7 \times (0.69 + 0.04 + 0.04 + 0.052 + 0.6 + 0.272 + 0.22) \times 5 = 4.10(W)$

■Total power consumption for 5VDC logic circuits of all module

$W_{5V} = (0.69 + 0.04 + 0.04 + 0.052 + 0.6 + 0.272 + 0.22) \times 5 = 9.57(W)$

■Total of the 24VDC average power consumption of the output module

$W_{24V} = 0.01 \times 24 \times 1 = 0.24(W)$

■Average power consumption when the voltage drop of the output module occurs

$W_{OUT} = 0.1 \times 0.2 \times 16 \times 1 = 0.32(W)$

■Average power consumption at the input section of the input module

$W_{IN} = 0.004 \times 24 \times 32 \times 1 = 3.07(W)$

■Power consumption of the external power supply used for each module

$W_S = 0.192 \times 24 = 4.61(W)$

Power consumption of the overall system

$W = 4.10 + 9.57 + 0.24 + 0.32 + 3.07 + 4.61 = 21.91(W)$

Appendix 7 Precautions for Battery Transportation

When transporting lithium batteries, follow the transportation regulations.

Regulated models

The batteries for the CPU module are classified as shown below.

Model	Supply status	Classification for transportation
Q7BAT	Lithium battery	Dangerous goods
Q6BAT	Lithium battery	Non-dangerous goods

Transport guidelines

Products are packed in compliance with the transportation regulations prior to shipment. When repacking any of the unpacked products for transportation, make sure to observe the IATA Dangerous Goods Regulations, IMDG (International Maritime Dangerous Goods) Code, and other local transportation regulations.
For details, please consult the shipping carrier used.

Appendix 8 Handling of Batteries and Devices with Built-In Batteries in EU Member States

This section describes the precautions for disposing of waste batteries in EU member states and exporting batteries and/or devices with built-in batteries to EU member states.

Disposal precautions

In EU member states, there is a separate collection system for waste batteries. Dispose of batteries properly at the local community waste collection/recycling center.
The following symbol mark is printed on the batteries and packaging of devices with built-in batteries. The symbol mark indicates that batteries need to be disposed of separately from other wastes.

This symbol mark is for EU member states only.
The symbol mark is specified in the new EU Battery Directive (2006/66/EC) Article 20 "Information for end-users" and Annex Ⅱ.

Exportation precautions

The new EU Battery Directive (2006/66/EC) requires the following when marketing or exporting batteries and/or devices with built-in batteries to EU member states.

- To print the symbol mark on batteries, devices, or their packaging
- To explain the symbol mark in the manuals of the products

Labeling

To market or export batteries and/or devices with built-in batteries, which have no symbol mark, to EU member states, print the symbol mark describes in the following on the batteries, devices, or their packaging.
☞ Page 136 Disposal precautions

Explaining the symbol in the manuals

To export devices incorporating Mitsubishi programmable controller to EU member states, provide the latest manuals that include the explanation of the symbol mark.
If manuals are not provided, separately attach an explanatory note regarding the symbol mark to each manual of the devices.

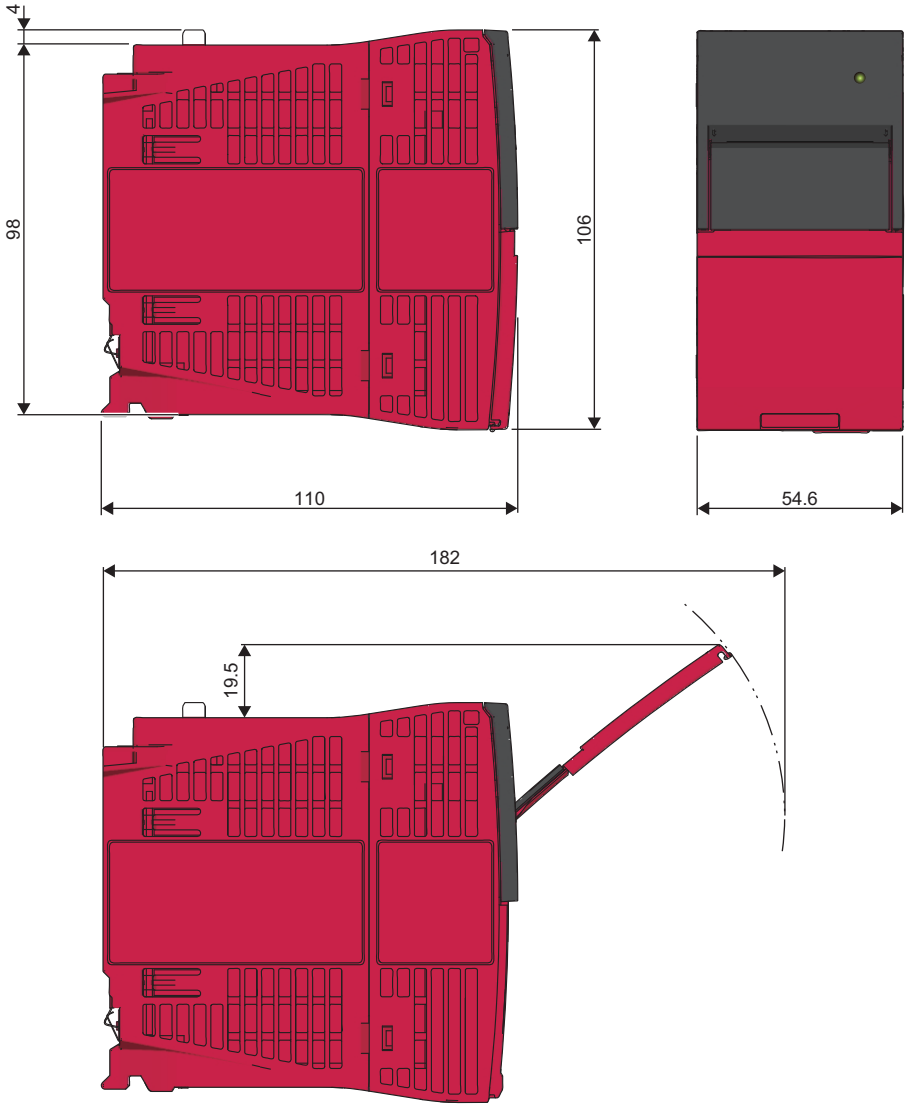
Point

The requirements apply to batteries and/or devices with built-in batteries manufactured before the enforcement date of the new EU Battery Directive (2006/66/EC).

Appendix 9 External Dimensions

Power supply module

- R61P, R62P, R63P, R64P



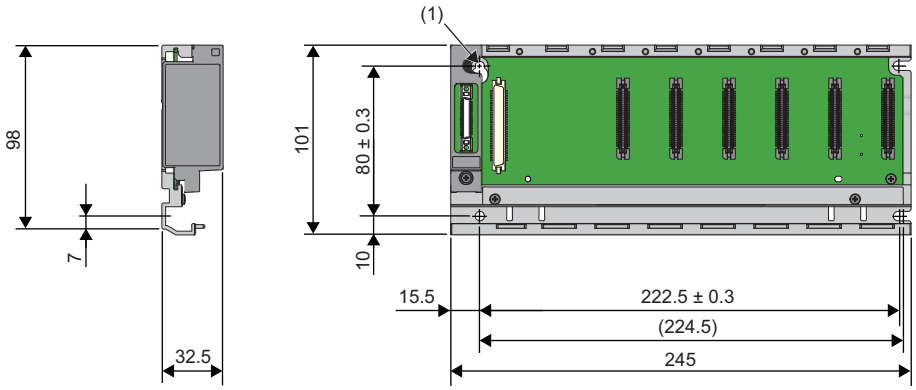
(Unit: mm)

Base unit

Main base unit

• R35B

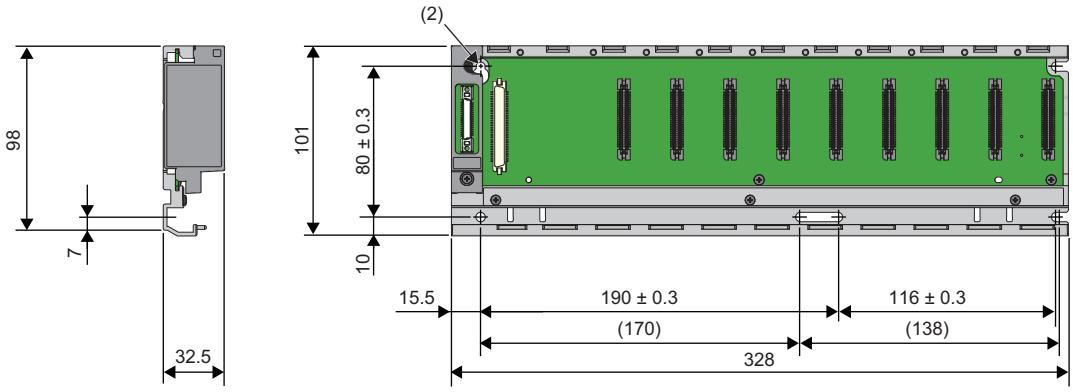
(1) 4 mounting screws (M4×14)



(Unit: mm)

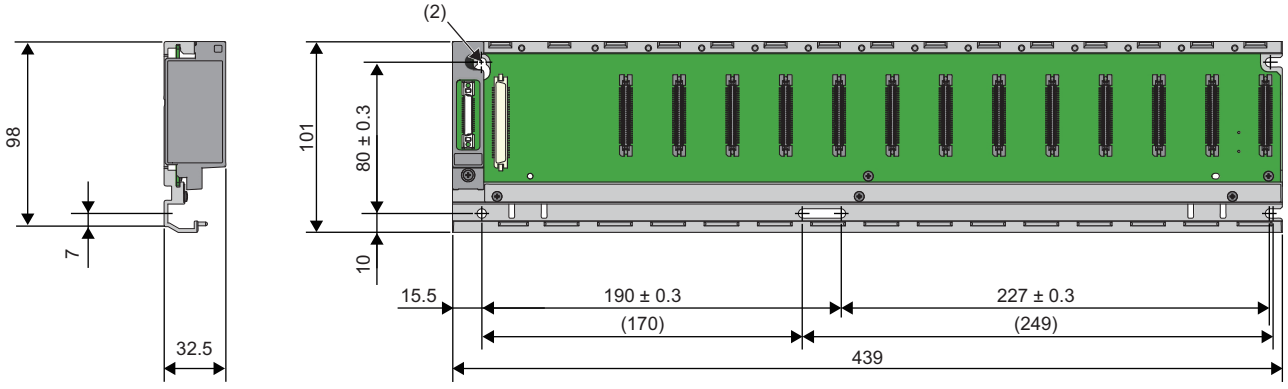
• R38B

(2) 5 mounting screws (M4×14)



(Unit: mm)

• R312B

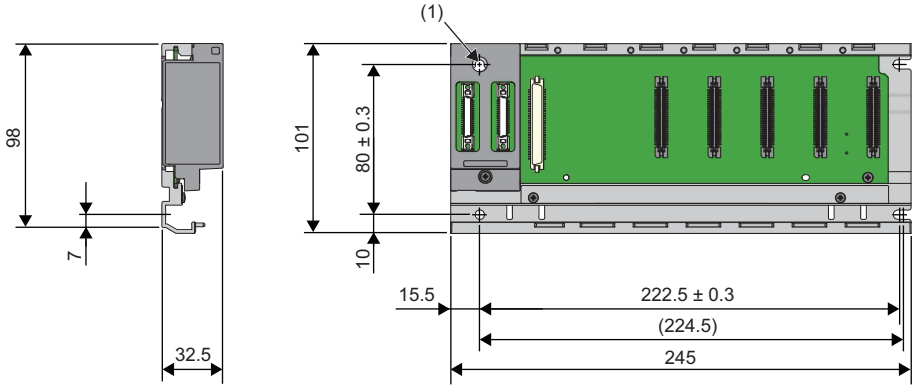


(Unit: mm)

Extension base unit

• R65B

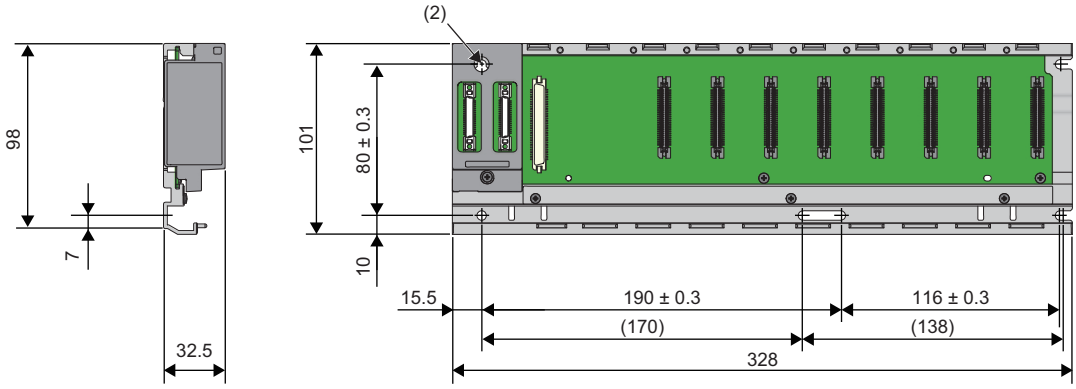
(1) 4 mounting screws (M4×14)



(Unit: mm)

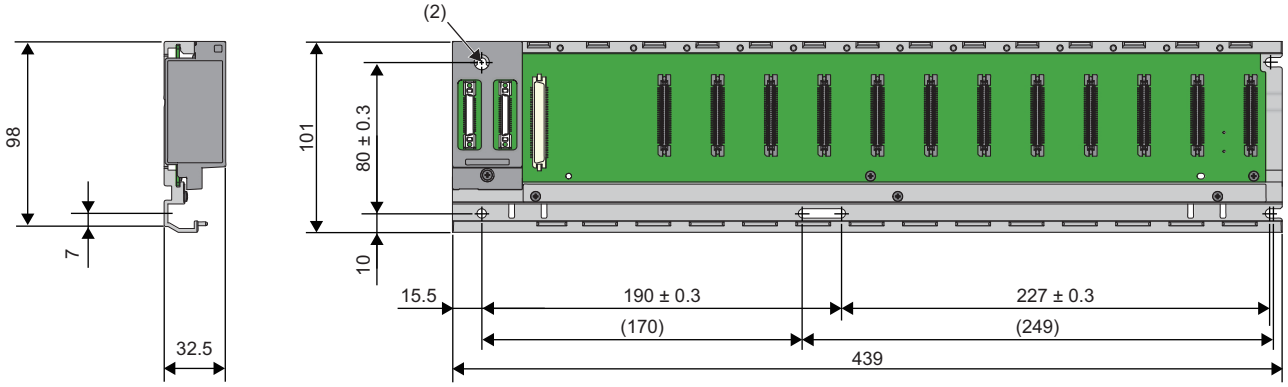
• R68B

(2) 5 mounting screws (M4×14)



(Unit: mm)

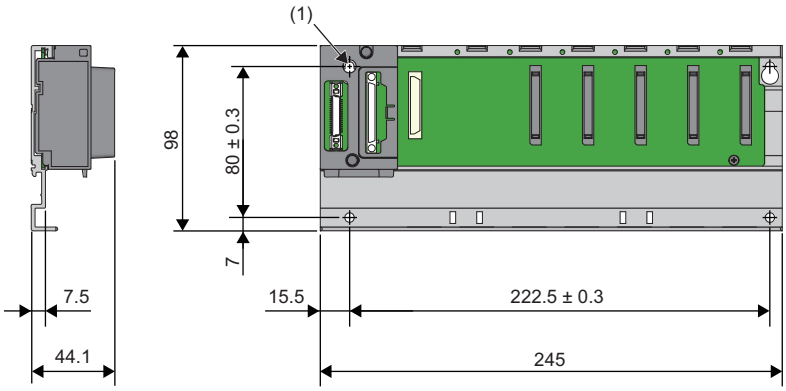
• R612B



(Unit: mm)

RQ extension base unit

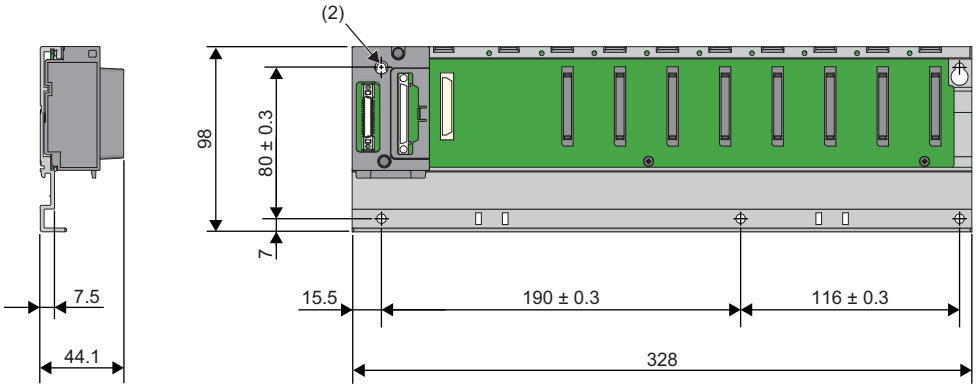
• RQ65B



(1) 4 mounting screws (M4×14)

(Unit: mm)

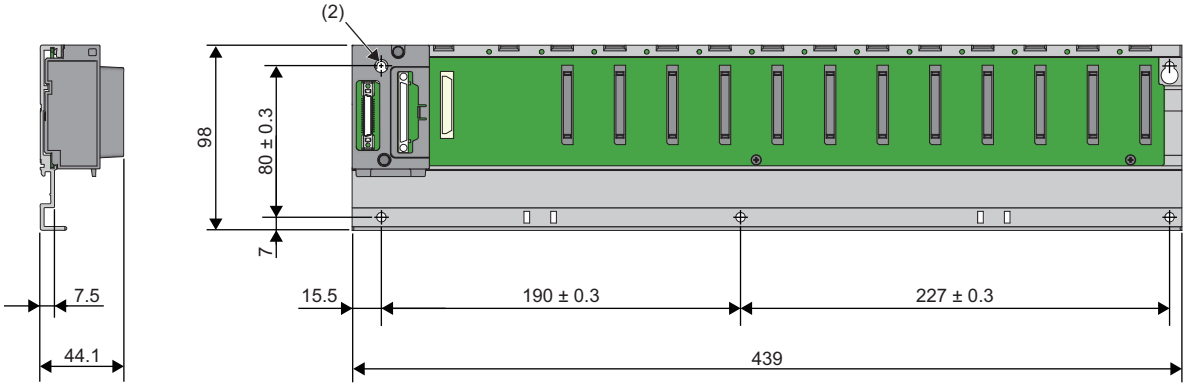
• RQ68B



(2) 5 mounting screws (M4×14)

(Unit: mm)

• RQ612B



(Unit: mm)

INDEX

REVISIONS

*The manual number is given on the bottom left of the back cover.

Revision date	*Manual number	Revision
June 2014	SH(NA)-081262ENG-A	First edition
November 2014	SH(NA)-081262ENG-B	■Added or modified parts TERMS, Section 1.1, 1.2, Appendix 1, 3, 4
January 2015	SH(NA)-081262ENG-C	■Added models R62P, R64P ■Added or modified parts SAFETY PRECAUTIONS, INTRODUCTION, TERMS, Section 1.1, 1.2, 3.1, 3.3, 4.2, 4.4, 4.5, 5.7, 5.8, Chapter 6, Appendix 3, 4, 5, 6, 9

Japanese manual number: SH-081222-C

WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place. Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.

(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.

1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
2. Failure caused by unapproved modifications, etc., to the product by the user.
3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.

(2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation of damages caused by any cause found not to be the responsibility of Mitsubishi, loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products, special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products, replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

TRADEMARKS

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MODEL: R-MK-E
MODEL CODE: 13JX01

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